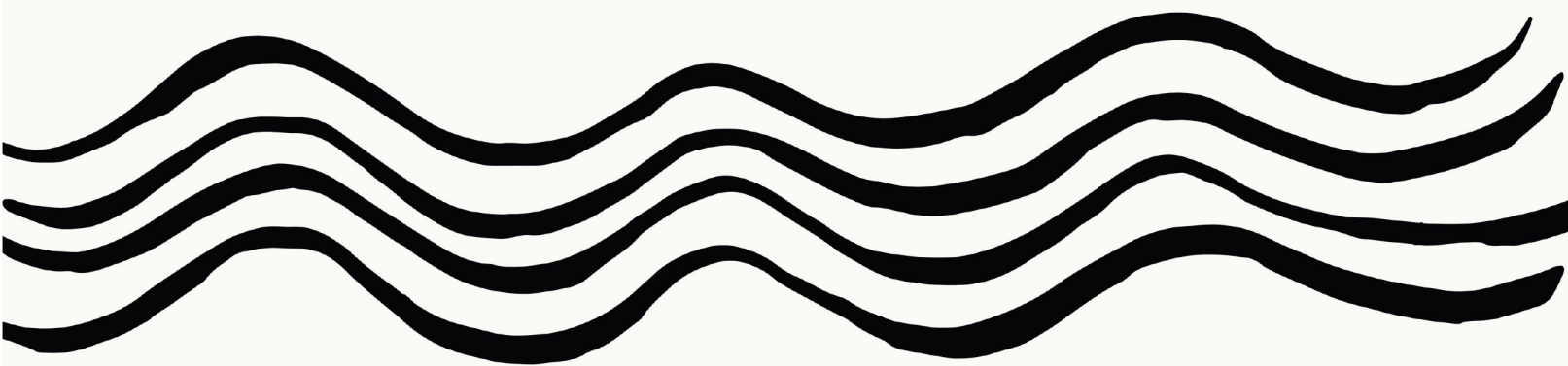




FROM **FOREST** TO **SEA**

KERALA PEOPLE'S
ENVIRONMENTAL CHARTER

**A FRAMEWORK FOR
POLITICAL MANIFESTOS AND
ECOLOGICAL GOVERNANCE**



FROM FOREST TO SEA

Kerala People's Environmental Charter

A Manifesto for Ecological and Climate Governance

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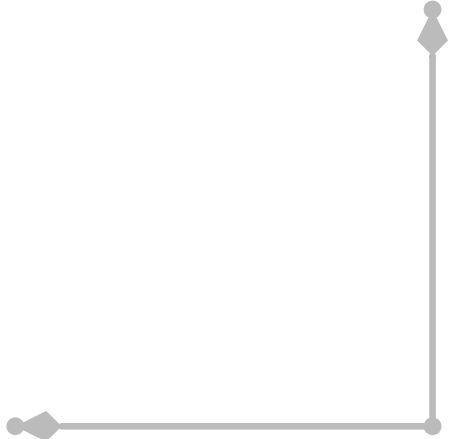
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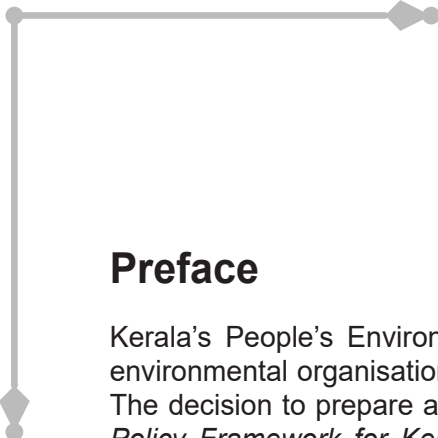
Prepared by
Sahyadri Environment Summit-2026 &
Kerala Paristhithi Aikyavedi

Cover design
Vaishna Vasuki

Layout & Print
Akshara Offset, Trivandrum

For details and copies contact
8281288539, 9995358205, 9497640847





Preface

Kerala's People's Environmental Charter emerges from a collective process initiated by environmental organisations, researchers and community representatives across the state. The decision to prepare a Green Manifesto titled *"From Forest to Sea – An Environmental Policy Framework for Kerala"* was taken at the Sahyadri Environmental Summit held in Wayanad from 24–26 January 2026.

The Charter arises from a shared concern that Kerala's ecological systems - from the forests of the Western Ghats to its rivers, wetlands, farms and coastal seas - are under growing stress from climate change, ecological degradation and unsustainable development pathways. These challenges demand clear policy direction and long-term commitments that go beyond isolated programmes or short-term responses.

This document therefore presents a set of science-based policy commitments intended to guide public debate and government policies and actions. It encourages all political parties to adopt them as part of their programmes and manifestos. By doing so, Kerala can strengthen ecological resilience, protect livelihoods and ensure that development proceeds within the limits of the natural systems that sustain the state.

11/3/2026

Sahyadri Environment Summit 2026
Kerala Paristhithi Aikya Vedhi



Introduction

Kerala's landscapes - from the forests of the Western Ghats through hill slopes, midlands, plantations and farms to rivers, wetlands and coastal seas - form an **interconnected mosaic of ecosystems linked from ridge to sea**. Rainfall flows through grasslands, forests, slopes and midland landscapes into rivers and wetlands before reaching the coast. Water, soil, biodiversity and livelihoods move through this continuum, so disturbances in one part of the landscape affect the whole system.

These ecosystems sustain Kerala's water security, food systems, biodiversity, livelihoods, public health and climate resilience. Yet many of them are now under increasing strain. Floods, landslides, coastal erosion, tidal flooding, heat stress and pollution are no longer isolated events. They cause deeper ecological stress that is intensified by climate change and by weaknesses in planning and governance.

Kerala has improved its disaster response system in recent years. But response alone cannot secure the future. The climate crisis demands a shift **from reactive management to preventive governance**. Ecological understanding must guide planning, budgeting, infrastructure design, agriculture, industry and urban development.

This document presents **Kerala's People's Environmental Charter**. It calls on political parties to adopt a shared ecological commitment that goes beyond electoral cycles. Environmental governance can no longer be treated as a sectoral concern. It is central to fiscal stability, food security, public safety and social justice.

From forest to sea, Kerala's future depends on restoring ecological integrity, integrating climate action across all sectors and departments, and ensuring that development strengthens rather than weakens natural systems that sustain the state.

PART I - The Case for Ecological Governance

Chapter 1

Kerala at an Ecological Crossroads

Kerala is experiencing growing ecological stress. The warning signs are visible across the state: recurring floods and landslides, coastal erosion and tidal flooding, declining wetlands, rising heat stress, water pollution, and increasing pressure on forests, hills and coastal ecosystems.

These problems are often treated as separate issues. In reality they are interconnected.

The forests of the Western Ghats regulate rainfall, store carbon and feed rivers. Hill slopes and plantation landscapes channel water into springs and streams. The midlands form a transition zone of farms, settlements and drainage networks. Wetlands and paddy fields absorb seasonal excess water. Rivers carry water, sediment and nutrients to the coast. The shoreline protects settlements and sustains marine livelihoods. Disturbances in any part of this chain affect the entire system.

Over the past decades this ecological balance has weakened. Forests have been fragmented. Wetlands and paddylands have declined. Floodplains have been narrowed or encroached upon. Quarrying and hill cutting have intensified in sensitive landscapes. Infrastructure projects have disrupted natural drainage channels. Urban expansion has hardened surfaces and increased heat stress. Rivers and water bodies face rising pollution. Coastal erosion has accelerated in several stretches. Monoculture plantations and chemical-intensive farming have weakened ecological resilience and increased vulnerability to climate variability.

When drainage paths are blocked, wetlands filled, hills destabilised or river flows altered, the landscape loses its ability to absorb and regulate water. Rainfall that once moved through natural systems now turns into

destructive floods or landslides.

Climate change is intensifying these risks. Extreme rainfall events are becoming more intense and increasingly disruptive. Heat stress is emerging as a serious public health concern. Sea-level rise and changing coastal currents are increasing the vulnerability of coastal settlements and fishing communities. Tidal flooding and sea intrusion are becoming more visible along many parts of the coast.

Kerala has strengthened its disaster response capacity in recent years. Yet response alone cannot address the underlying causes of risk. Rebuilding after disasters without addressing ecological weaknesses leads to repeated damage and rising public costs. Disaster relief, infrastructure repair and agricultural losses already place increasing pressure on public finances.

The ecological and climate crises confronting Kerala demand political leadership and governments that are ecologically informed and firmly committed to addressing environmental realities. Without such commitment, development decisions risk deepening ecological damage, multiplying disasters and increasing their economic burden on society.

Kerala now stands at an ecological crossroads. The question is not whether development should continue. The real question is whether development will strengthen the ecological systems that sustain the state - or further weaken them. Meeting this challenge requires a new approach to governance that integrates ecological realities into planning, infrastructure, agriculture, industry and public investment.

Chapter 2

From Disaster Management to Climate Governance

Kerala has invested significantly in disaster preparedness and response. These systems are essential and must continue to improve. However, disaster management is inherently reactive: it addresses the consequences of events rather than the conditions that create risk.

Climate change and ecological degradation require a more anticipatory approach. Climate risk and ecological integrity must become routine considerations in public finance, infrastructure planning, agriculture, urban development and industrial policy. Risk assessment, mitigation, adaptation and resilience must be integrated into everyday administrative decision-making.

At present, environmental concerns often remain confined to regulatory clearances or specific departments. Climate action is treated as a separate programme rather than as a guiding principle across sectors.

This fragmentation leads to policy inconsistency. For example:

- Infrastructure projects may proceed without adequate hydrological screening.
- Urban expansion may ignore heat mitigation and drainage systems.
- Wetlands may be reclassified or filled without cumulative ecological assessment.
- Coastal projects may advance without shoreline monitoring or sediment studies.
- Hill infrastructure and tunnels may be approved without adequate hydrogeological, geological, or landslide-risk assessments.

Such decisions create long-term ecological and economic vulnerabilities that disaster management systems later struggle to address.

Kerala therefore needs to move from fragmented Climate disaster management to **integrated climate governance**.

This requires three key changes:

- Climate risk and ecological impacts must be incorporated into budgeting and financial planning. Public expenditure should be evaluated for ecosystem integrity, emissions implications and resilience outcomes.
- Major projects must undergo mandatory climate, hydrological and ecological screening before approval.
- Government departments must operate through structured convergence so that agriculture, water management, energy transition, infrastructure planning and local governance work toward shared climate and ecological objectives.

To enable this transition, Kerala should establish a **Climate Action and Resilience Mission** to integrate climate considerations into planning, budgeting and implementation across sectors. This mission should complement existing disaster management institutions while focusing on mitigation, adaptation and long-term resilience.

Climate governance is therefore not an additional administrative burden. It is a necessary framework for managing risk and securing Kerala's future.

Chapter 3

A People's Environmental Charter

Environmental governance cannot depend on electoral cycles or changing administrative priorities. Kerala's ecological stability requires continuity of commitment across political transitions.

This document proposes a **People's Environmental Charter** for adoption by political parties in Kerala. It outlines institutional reforms, legal measures and measurable commitments required to secure the state's ecological resilience. In this Charter, ecological governance means planning, budgeting and development decisions guided by ecological limits, climate risk, landscape integrity and the protection of livelihoods.

Kerala should:

- Integrate climate and ecological considerations into financial planning and development decisions across sectors.
- Protect ecologically sensitive landscapes from incremental degradation.
- Restore forests, rivers, wetlands and shorelines as natural infrastructure for resilience.
- Design infrastructure that respects monsoon hydrology and natural drainage systems.
- Support forest-dwelling communities, farmers and fisherfolk in adapting to climate variability and ecological change.
- Ensure transparency and public access to environmental information and data.
- Strengthen environmental regulation so that compliance becomes real and effective.

This Charter does not oppose development. It calls for real sustainable and lasting development that strengthens ecological systems, and builds climate resilience rather than undermining them.

From forest to sea, Kerala's future depends on systemic reform - not isolated projects, reactive responses or symbolic commitments. Political leadership must act. Citizens must hold that leadership accountable.

The chapters that follow outline the key sectors where Kerala's policies and development practices must evolve - from agriculture and food systems, forests and biodiversity, hill slopes and midland landscapes, rivers and wetlands, coastal and marine ecosystems, infrastructure and drainage, mining and material use, urban ecology, waste management and pollution control, tourism, and to energy transition.

They also address the institutional reforms needed for effective implementation, including climate governance, ecological zoning and spatial planning, environmental data transparency, ecological budgeting, and systems of monitoring and accountability.

For each sector, the Charter identifies actions that Kerala should undertake. These are also **Manifesto Commitments** that political parties can adopt. These commitments form a comprehensive environmental policy framework for Kerala.

Political parties are encouraged to incorporate them into their manifestos and commit to transparent implementation, public participation and measurable outcomes. People are encouraged to discuss the manifesto as such and take it forward to public development discussions at all levels in Kerala.

PART II - Transforming Kerala's Ecological Landscape and Economy

The principles outlined in the previous section must now be translated into action across the sectors that shape Kerala's landscapes, livelihoods and development pathways.

The chapters in this Part examine these sectors and outline the **What Kerala Should Do (Manifesto Commitments)**. These are policy directions and programme suggestions needed to strengthen ecological resilience and align development with Kerala's environmental realities.

Chapter 4

Agriculture, Food Systems and Rural Transition

Agriculture in Kerala is more than an economic activity. It is central to food security, rural

livelihoods and the ecological stability of the state. Farming systems nurture soil health, water flows, biodiversity, micro-climate and nutrition. Paddy fields, wetlands and diversified farms absorb rainfall, recharge groundwater and regulate seasonal water flows. In this sense, agriculture functions as ecological infrastructure. When agricultural landscapes weaken, both livelihoods and ecological stability are affected.

Kerala's agriculture today faces multiple pressures. Climate variability is increasing. Extreme rainfall and dry spells affect productivity. Soil fertility has declined in many areas. Dependence on chemical inputs has created ecological and health concerns. Agricultural land continues to shrink or fragment, and many farmers struggle with unstable prices and rising production costs. At the same time, Kerala's agrarian landscape has distinctive strengths. Much of the state's agriculture is organised through homestead farming systems, paddy cultivation and plantation crops such as coconut, rubber, coffee, tea, spices and cocoa. These systems support livelihood, local food security and rural economies.

The challenge is not simply to increase production, but to strengthen ecological resilience, safe productivity, food security and farmer livelihoods together.

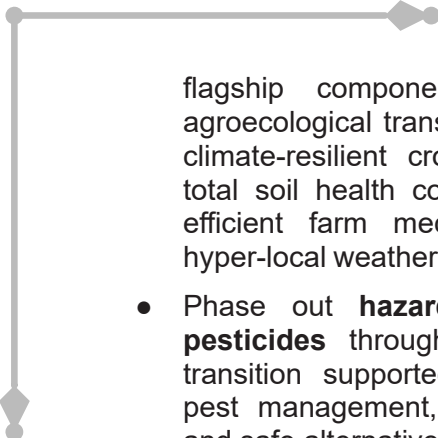
Kerala has already taken important steps

through initiatives such as the Organic Farming Mission. These efforts now need to be expanded and integrated into a broader transition toward **agroecological farming systems** that are climate-resilient, economically viable, diversifying local food baskets and environmentally sustainable. At the same time, agriculture must be supported through fair pricing systems, modern markets, local food networks and rural entrepreneurship so that farming remains a viable livelihood for future generations.

What Kerala Should Do (Manifesto Commitments)

Agroecological Transition and Farm Resilience

- Launch an **Agroecology Transition Programme** to adopt **agroecology** as the long-term direction of agricultural policy, research and extension so that farming systems become ecologically safe, economically viable and resilient to climate variability.
- Fully implement and scale the **Organic Farming Mission** through cluster-based programmes that support farmers during the transition from chemical-intensive agriculture.
- Implement the **Climate Resilient and Energy Efficient Agriculture (CREEA) Programme** as a



flagship component of Kerala's agroecological transition to promote climate-resilient cropping systems, total soil health coverage, energy-efficient farm mechanisation and hyper-local weather forecast system.

- Phase out **hazardous chemical pesticides** through a time-bound transition supported by ecological pest management, farmer training and safe alternatives.
- Strengthen **soil health restoration** through ecological farming practices, crop diversity, organic matter regeneration and improved soil-management systems.
- Protect and promote **indigenous seeds and traditional crop diversity** through community seed banks, farmer seed networks and strengthened public research support.
- Uphold **strong biosafety safeguards and the precautionary principle** regarding genetically modified and gene-edited crops.
- Address the **legacy of Endosulfan contamination** through sustained medical care, rehabilitation and livelihood support for affected families while strengthening safeguards against hazardous pesticide use.

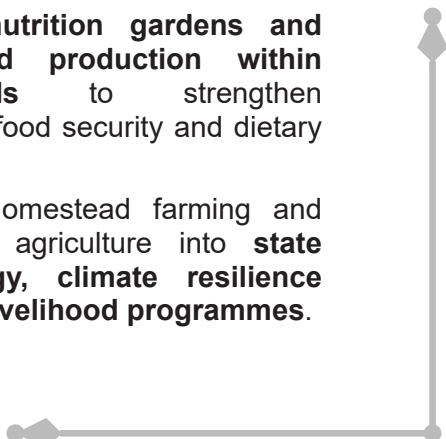
Paddy Landscapes, Wetlands and Food Security

- Protect **paddy lands and agricultural wetlands** from conversion and fragmentation, recognising their role in flood mitigation, water management and food security.
- Establish a **Statewide Paddy Revival Mission** to restore and bring paddy fields back into cultivation across the state.
- Ensure the **economic viability of paddy cultivation** through collectivisation, remunerative procurement systems, timely payments and fair pricing

mechanisms.

- Strengthen **public procurement and decentralised rice-milling systems** to support local production and reduce supply-chain vulnerabilities.
- Integrate **paddy cultivation with flood management and landscape-level water planning**.
- Introduce **Ecological Service Payments** for farmers who conserve wetlands and maintain paddy cultivation in flood-prone landscapes, including additional incentives of at least ₹2,500 per acre per year.

Homestead Farming and Tree-Based Agriculture

- Recognise **homestead farming systems** as a cornerstone of Kerala's food security, biodiversity conservation and climate resilience.
 - Promote **diversified tree-based farming systems** integrating homestead gardens, coconut-based systems, and multi-layer cropping that integrate indigenous trees, trees-for-wood, fruits, vegetables, spices, tubers, medicinal plants and small livestock.
 - Encourage **agroforestry models and multi-tier cropping systems** that combine perennial trees with food crops, strengthening soil health, biodiversity climate resilience and income generation.
 - Support homestead farmers through **extension services, quality planting materials, composting systems and soil-health programmes**.
 - Promote **nutrition gardens and local food production within homesteads** to strengthen household food security and dietary diversity.
 - Integrate homestead farming and tree-based agriculture into **state agroecology, climate resilience and rural livelihood programmes**.
- 

Plantation Crop and Agroforestry

- **Launch a Kerala Plantation Revival and Diversification Mission** to support the ecological and economic transformation of plantation landscapes - including rubber, coconut, coffee, tea, cocoa, cardamom and pepper - through diversified agroforestry systems, soil restoration, climate-resilient crop systems, value addition and income stabilisation measures.
- Promote **diversified plantation systems and agroforestry models** that combine plantation crops with food crops and biodiversity-supporting vegetation.
- Strengthen **price-stabilisation mechanisms and income-support systems** for plantation farmers

during periods of market volatility.

- Support replanting programmes, soil restoration and climate-resilient crop varieties.
- Promote **value addition, processing and branding** to improve farmer incomes from plantation crops.

Reviving Agricultural Landscapes and Farmer Participation

- Establish **Panchayat-level agricultural land banks** to bring fallow land back into cultivation through farmer groups, cooperatives and youth initiatives.
- Promote **youth participation in agriculture** through training programmes, start-up support and cooperative farming models.

Chapter 5

Forests, Western Ghats and Biodiversity

Kerala's forests and the Western Ghats form the ecological foundation of the state's ridge-to-sea landscape. They regulate rainfall, sustain rivers, conserve globally significant biodiversity and influence agriculture, water security and climate resilience across Kerala.

Disturbances in these landscapes have cascading effects across the state - from landslides in the high ranges and midland slope instability to floods in the river basins and erosion along the coast. Western Ghats is one of the oldest mountain ranges in the world. Its age and weathering of rocks increases the possibility of slope failures in climate induced heavy rains. Protecting the Western Ghats is therefore not only a conservation priority but also a critical requirement for water security, disaster risk reduction and long-term ecological stability.

At the same time, these landscapes are home to farmers, plantation workers and Adivasi communities whose livelihoods and rights must be respected. Ecological governance in the Western Ghats must therefore combine biodiversity conservation, habitat connectivity, ecological restoration, conflict mitigation and livelihood security through transparent and science-based institutions.

What Kerala Should Do (Manifesto Commitments)

Western Ghats Ecological Governance

- Recognise the **Western Ghats as a critical ecological and geological system** for Kerala's water security, biodiversity conservation and climate resilience.
- Complete **time-bound identification and notification of Ecologically Sensitive Zones (ESZ)** through transparent scientific mapping and public consultation, and publish ESZ boundaries, distance criteria and KML maps for all protected areas in Kerala. Demarcate no go areas in high elevation and slopes.
- Establish a **Western Ghats Ecological Governance Council** as a multi-stakeholder body to review scientific assessments - including the WGEEP recommendations - and guide participatory ecological planning.
- Formulate a **Western Ghat Regulation Policy** - with clear development and land use guidelines in high elevations and slopes of Western Ghats
- Integrate **forest conservation, watershed protection, agriculture, settlement planning and infrastructure development** through a landscape-based governance framework for Western Ghats districts.
- Ensure that **development proposals in Western Ghats regions are evaluated against ecological carrying capacity**, based on rigorous scientific assessment and transparent decision-making.
- Publish a **State of Forests White Paper** detailing forest degradation trends, land-use changes, biodiversity status and restoration priorities.
- Implement **institutional and legal reforms necessary for long-term ecological governance** of the Western Ghats.
- Ensure that conservation policies remain sensitive to the concerns of **farmers, plantation workers and communities living within**

Western Ghats landscapes.

- Safeguard the rights of **Adivasi and forest-dependent communities**, including protection from land alienation and support for nature-based livelihoods.
- Prevent further **large-scale forest encroachments**, particularly commercial encroachments, while ensuring just rehabilitation and livelihood support for vulnerable communities.

Habitat Conservation & Landscape Connectivity

- Legally secure and restore **wildlife corridors**, including Kerala's seven identified elephant corridors. Ensure adequate land and livelihood compensation and rehabilitation for affected farmers and adivasi families.
- Acquire ecologically critical forest areas through **voluntary rehabilitation programmes with fair compensation and long-term livelihood support**.
- Prevent further **fragmentation of forests caused by roads, tourism infrastructure, mining, real estate and other linear developments**.
- Adopt a strict **avoidance policy against new roads in core forest areas, elephant corridors, ESZ regions, critical wildlife habitats and fragile hill landscapes**.
- For existing roads passing through wildlife habitats, implement mitigation measures including **speed regulation, traffic management, wildlife crossings and restrictions on night traffic and safari activities**.
- Recover **forest lands currently held by other government departments or corporations** by cancelling patta conditions where applicable.
- Establish a **State Mission to identify and recover illegal or expired forest leases**.

- Identify and acquire **ecologically important private plantations and estates**, including colonial-era holdings, where necessary to strengthen habitat restoration and landscape connectivity.
- Formulate a regulatory policy to tourism activities in and around wildlife habitats and protected areas.

Strengthening the Protected Area Network

- Notify new **protected areas in ecologically significant landscapes**, including Ponmudi, Goodrical and Shiruvani.
- Expand **Aralam Wildlife Sanctuary into the upper reaches of Thirunelli Reserve Forest**.
- Notify **Camel Hump Mountain as a National Park** to protect the habitat of Banasura Chilappan.

Plantation Landscapes at Forest Interfaces

- Recognise **plantation landscapes adjoining forests** as important ecological transition zones between forests and human settlements.
- Promote **diversified plantation systems and agroforestry models** that strengthen biodiversity, soil health and habitat connectivity.
- Support farmers conserving **indigenous tree species** through incentive mechanisms such as tree-banking initiatives.
- Provide support systems for farmers in plantation regions facing **ecological risks and human-wildlife conflict**.

Human-Wildlife Conflict Mitigation and Coexistence

- Adopt **human safety and wildlife conservation from a coexistence perspective** as the guiding principle for managing human-wildlife conflict.

- Strengthen **early warning systems, rapid response teams, primary response teams and community watchers** in conflict hotspots.
- Ensure **time-bound compensation (within 30 days) and full compensation covering verified losses** for crop damage, livestock loss, property damage, injury or death caused by wildlife.
- Promote **community-based mitigation systems**, including support for fencing, crop protection measures and local monitoring networks.
- Establish a **universal insurance system for farmers** covering crop, livestock and property losses in wildlife-conflict landscapes.
- Strengthen **coordination among relevant government departments** for conflict mitigation while ensuring that the **Chief Wildlife Warden retains final statutory authority in wildlife management decisions**.
- Establish a **statutory interstate wildlife conservation coordination mechanism** involving Kerala, Karnataka and Tamil Nadu, comprising the three Chief Wildlife Wardens and regional forest officials.
- Improve monitoring and management of **high-frequency conflict species**, including wild boar, monkeys, elephants and deer.
- Integrate **wildlife movement and conflict risks into land-use planning and infrastructure design**.
- Relocate communities from **known elephant corridors and high conflict areas** such as 301 colonies in Munnar and Aralam and support 10-year livelihood programmes for smooth transitions.
- **Improve public awareness** regarding wildlife behaviour, wildlife mating seasons and bring in seasonal regulations in tourism.
- Establish a conflict mitigation

mechanism integrating Panchayathi Raj, Participatory Forest Management and Forest and wildlife Department systems utilising the legislative possibilities of Wildlife Protection Act, Indian Biological Diversity Act, Panchayathi Raj Act and Forest Rights Act.

Mission for Invasive Species Removal and Forest Restoration

- Launch a **State Mission for Invasive Species Removal and Forest Ecosystem Restoration** targeting species such as *Lantana camara*, *Senna spectabilis*, *Chromolaena odorata* and *Mikania micrantha*.
- Restore **native vegetation and wildlife habitats in degraded forest areas**, including phasing out monoculture plantations such as teak, eucalyptus and wattle through selective ecological restoration.
- Provide **dedicated funding and scientific monitoring systems** for restoration programmes.
- Involve **local communities in restoration activities and ecological monitoring**.
- Launch a multi-stakeholder (including nurseries) **statewide awareness and regulatory programme** to prevent the introduction and sale of new invasive plant and animal species, thereby averting future ecological damage to natural and agricultural landscapes.

Transparency and Ecological Monitoring

- Establish a **public ecological information system** covering forest health, wildlife populations, habitat corridors and human-wildlife conflict incidents with validated real-time data updates.
- Publish periodic **State of Forests and Biodiversity Reports**.
- Improve transparency in **wildlife compensations systems, ecological**



restoration programmes and forest governance decisions.

Community Rights over Forest

- **Implement the Forest rights act 2006** in its full sense with acknowledgement of community rights to forest dwelling adivasi

communities. Relocate people from corridors and conflict hotspots only after recognition of full rights with fully informed consents and fair compensation admitting the historical injustice.

Chapter 6

Midland Hills, Laterite Landscapes and Slopes

Kerala's midland hills and laterite landscapes form a crucial link in the state's ridge-to-sea ecological continuum. These landscapes regulate groundwater recharge, sustain springs and streams, support biodiversity and influence the hydrology of rivers that flow downstream to wetlands and coastal systems.

Much of Kerala's settlement, agriculture and plantation activity occurs in these midland regions. Plantation crops such as rubber, coconut, arecanut, cashew and mixed spice systems dominate many slopes. The way these landscapes are managed therefore has major implications for slope stability, water security, biodiversity and disaster risk across the state.

In many parts of northern and central Kerala, the midlands contain distinctive laterite landscape features such as hilltop plateaus (*motta*), seasonal depressions (*pallom*), and streamside forest patches (*kaanam*) that protect springs and headwater streams. Many small streams (*thodu*) that later become rivers originate in these landscapes. Traditional groundwater systems such as *suranga* tunnel wells in Kasaragod reflect long-standing community knowledge of managing water in laterite terrains.

However, midland hills are increasingly under pressure from hill cutting, quarrying, laterite mining, road construction and unregulated building expansion. Such disturbances alter natural drainage systems, destabilise slopes and increase risks such as landslides, soil erosion and soil piping events.

Protecting midland hills and slopes is therefore essential for groundwater security, river health, biodiversity conservation and disaster risk reduction across Kerala.

What Kerala Should Do (*Manifesto Commitments*)

Protecting Midland Hills and Laterite Landscapes

- Recognise midland hills and laterite **Protecting Springs, *Thodus* and Natural Drainage**
- Map and legally protect **first-order streams, springs, small headwater streams (thodus) and seasonal drainage channels** originating in midland landscapes.
- Prevent **hill cutting, construction and land levelling that blocks or alters natural drainage channels**.
- Integrate **springshed protection and small watershed restoration** into local government development planning.
- Restore **degraded natural drainage channels, small streams and hill drainage systems** that have been disrupted by land-use change.
- Protect **laterite hill ponds and seasonal wetlands** that enhance groundwater recharge and sustain water availability for wildlife and local communities.

Plantation Landscapes on Slopes

- Promote plantation management practices that **strengthen soil stability, groundwater recharge and biodiversity** in midland landscapes.
- Encourage **diversified plantation systems and agroforestry models** that reduce erosion and improve ecological resilience.
- Promote **soil and water conservation practices** such as

contour planting, vegetative barriers, mulching and ground cover.

- Maintain **vegetation buffers along streams and drainage channels** within plantation landscapes.

Regulating Construction and Land Disturbance

- Introduce **clear guidelines for construction and land development on hill slopes and laterite terrains.**
- Require **geotechnical, hydrological and slope stability assessments** for major construction projects in midland landscapes.
- Strengthen land-use planning and building regulations to **reduce risks of soil piping, slope instability and drainage disruption.**
- Regulate **hill cutting and large-scale land levelling** that destabilise slopes and alter natural drainage systems.

Quarrying and Laterite Mining

- Prohibit **quarrying and laterite mining in ecologically sensitive midland landscapes.**
- Introduce **cumulative impact assessments for quarrying and mining** at watershed or panchayat scale.
- Strengthen **compliance monitoring and enforce ecological restoration of abandoned quarries and laterite pits.**

Infrastructure in Hill Landscapes

- Avoid major infrastructure projects

such as **tunnels and large hill-cut roads in areas identified as high landslide-risk or ecologically fragile zones.**

- Require **independent hydrogeological and landslide risk assessments** before approving tunnel projects in hill landscapes.
- Ensure that **infrastructure planning respects natural drainage systems, slope stability and ecological connectivity.**

Traditional Water Systems and Knowledge

- Recognise and protect **traditional groundwater systems such as suranga tunnel wells** in northern Kerala.
- Promote **restoration of traditional water harvesting systems** as part of climate resilience strategies.
- Integrate **traditional ecological knowledge into watershed management and landscape planning.**

Transparency and Monitoring

- Ensure **public access to data on hill cutting permits, quarry licences, landslide hazard mapping and watershed planning.**
- Strengthen monitoring of **slope stability, drainage disruption and land-use change in midland landscapes.**
- Promote collaboration between **scientific institutions, local governments and communities** for landscape monitoring.

Chapter 7

Water Security: Rivers, Wetlands, Floodplains and Groundwater

Kerala's rivers originate as springs and small streams in the grasslands and forests of Western Ghats and the midland hill landscapes. They flow through agricultural lands, settlements and wetlands before reaching the coast. The health of these rivers therefore depends on the integrity of the entire ridge-to-sea ecological continuum.

Although Kerala receives high annual rainfall, the state increasingly faces seasonal water stress, declining groundwater levels and severe flood impacts. The Post-Disaster Needs Assessment (PDNA) following the 2018 floods highlighted how river modification, floodplain encroachment, wetland loss, sand mining and drainage obstruction have increased ecological vulnerability and flood risks across river basins.

At the same time, rivers, wetlands and canals across Kerala face growing pollution from untreated sewage, industrial effluents, agricultural runoff and solid waste dumping. Water quality monitoring in several rivers and urban water bodies indicates increasing ecological stress.

Experiences from the Haritha Kerala Mission and local watershed restoration initiatives demonstrate that river rejuvenation and water conservation are possible when government departments, local governments and communities work together.

Securing Kerala's water future therefore requires a shift from fragmented interventions to **integrated river basin governance, watershed protection, wetland conservation, groundwater management and pollution control across the ridge-to-sea landscape.**

What Kerala Should Do (Manifesto Commitments)

River Basin Governance and Institutional Convergence

- Adopt **river basin-based planning** as the framework for managing Kerala's water systems.
- Establish a **Kerala River Basin and Water Systems Mission** to coordinate actions across departments, local governments, scientific institutions and community organisations.
- Institutionalise and strengthen the **convergence model demonstrated by the Haritha Kerala Mission**, aligning agriculture, irrigation, groundwater management, forest conservation, urban planning and disaster management in river revival and protection.
- Develop **integrated river basin management plans** for major river systems, organised through basin clusters with local panchayats and community participation.
- Strengthen the capacity of **local governments to implement watershed restoration and river protection programmes.**

Protecting Headwaters and Watersheds

- Protect **springs, first-order streams and headwater streams (thodus)** originating in the Western Ghats and midland landscapes.
- Strengthen **watershed restoration programmes through local governments and community participation.**

- Expand successful **watershed restoration initiatives undertaken by local self-government institutions.**
- Promote **soil and water conservation practices in upstream agricultural and plantation landscapes.**

Wetlands, Floodplain and Natural Flood Buffers

- Establish a **Kerala Wetland Mission** to coordinate wetland conservation, restoration, monitoring and community engagement across departments.
- Develop a **statewide wetland inventory and digital atlas** integrating hydrology, biodiversity, land ownership and ecosystem services.
- Ensure **complete identification, mapping and legal protection of wetlands** through public GIS access and strong enforcement mechanisms.
- Restore **degraded wetlands and river floodplains through ecological restoration programmes.**
- Strengthen wetland protection by **withdrawing dilutions to the Kerala Conservation of Paddy Land and Wetland Act (2008)** and restoring its original conservation intent.
- Protect **wetlands, river floodplains and low-lying agricultural lands that function as natural flood buffers.**
- Prevent **reclamation and conversion of wetlands and floodplains for real estate and infrastructure development.**
- Legally notify and protect **marshes, backwaters, mangrove ecosystems and Myristica swamps.**
- Promote **sustainable livelihoods in**

wetland landscapes.

- Seek **Ramsar designation for key wetlands** including Kottoli, Vellayini, Kattampally-Valapattanam-Kuppam and Kavvayi.

Mangrove Protection and Coastal Wetland Restoration

- Establish a **Kerala Mangrove Mission** coordinated by Forest, Revenue and Local Self Government Departments to restore and expand mangrove ecosystems.
- Notify **mangrove areas as Reserve Forests or Community Conservation Areas** where appropriate.
- Establish mechanisms that enable **voluntary conservation or transfer of privately owned mangrove patches**, with fair compensation and incentives for landowners to secure their long-term protection.
- Abandon proposals to **denotify mangrove reserve forests such as the Pavaratty mangrove forests.**
- Promote **livelihood opportunities linked to mangrove restoration and ecosystem services.**

Sustainable Inland Fisheries and Wetland Biodiversity

- Enforce **seasonal fishing bans in inland wetlands and water bodies during breeding periods**, through consultations with stakeholders and adequate livelihood support mechanisms during the ban.
- Protect **wetland biodiversity including migratory birds, fish, amphibians and endemic plant species** through habitat conservation and monitoring.

Pollution Prevention and Water Quality Restoration

- Ensure **zero discharge of sewage, industrial effluents** into rivers and wetlands.

- Establish **total sewage treatment and wastewater management** in urban and peri-urban areas.
- Ensure **total ban of dumping of solid waste and construction debris** into rivers, canals and wetlands.
- Strengthen **water quality monitoring systems with regular public disclosure of water quality data**.
- Strengthen the **capacity, staffing, laboratories and enforcement powers of the Kerala State Pollution Control Board**.

Industrial Pollution Hotspots and Clean Production Transition

Certain industrial clusters in Kerala have long posed serious risks to river health and surrounding communities. The industrial estates and chemical industries located in **Eloor and Edayar along the Periyar River** represent one of the most significant industrial pollution hotspots in the state.

Studies over several decades have documented concerns relating to **industrial effluents, contamination of river sediments, groundwater pollution and public health risks** in this region.

Kerala should therefore promote a planned transition from conventional pollution control approaches to **clean production and zero-discharge industrial systems**.

- Undertake **comprehensive environmental and health assessments of industrial pollution hotspots**, particularly the **Eloor–Edayar industrial belt** along the Periyar River.
- Strengthen **continuous and real-time monitoring** of industrial effluents, groundwater contamination and river pollution levels, with public access to monitoring data.
- Establish a dedicated **Clean**

Production and Zero Discharge Mission for ensuring Eloor-Edayar Industrial Estate transitions to a non-pollution zone, and this model be emulated across all industrial estates and complexes in Kerala.

- Support **technological upgrading through collaboration** among scientists, engineers, research institutions, workers, trade unions and industry management.
- Strengthen **regulatory enforcement and transparency** through improved monitoring systems and public disclosure of pollution data.

Groundwater Protection and Recharge

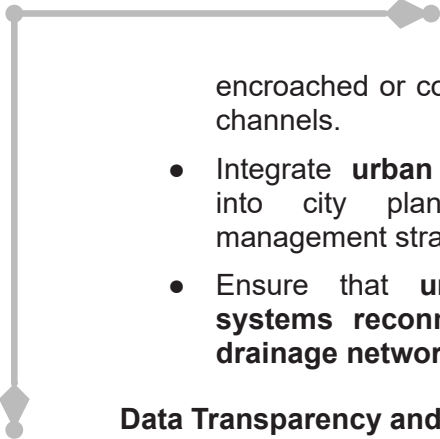
- Recognise **groundwater and springs as critical sources** of drinking water and irrigation.
- Protect **groundwater recharge zones** in both rural and urban landscapes.
- Promote **rainwater harvesting, aquifer recharge and watershed-based groundwater management**.
- Strengthen monitoring of **groundwater extraction and regulate unsustainable withdrawal**.
- Integrate **groundwater governance** with river basin planning and watershed restoration programmes.

Sand Mining and River Morphology

- Strengthen **regulation of river sand mining** through sand auditing and strict enforcement against illegal extraction.
- Promote **sustainable alternatives to river sand** in construction.
- Monitor **river morphology changes and restore degraded riverbanks**.

Urban Rivers, Canals and Drainage Systems

- Restore **urban rivers, canals and drainage networks** that have been



encroached or converted into waste channels.

- Integrate **urban river restoration** into city planning and flood management strategies.
- Ensure that **urban stormwater systems reconnect with natural drainage networks**.

Data Transparency and Water Monitoring

- Establish a **public water information**

system providing data on river flows, groundwater levels, water quality and watershed conditions.

- Publish periodic **State of Rivers and Water Systems Reports**.
- Strengthen **scientific monitoring through collaboration** between research institutions, universities, local governments and community groups.

Chapter 8

Coastal and Marine Ecosystems

Kerala's coast is both a fragile ecological system and a densely inhabited livelihood landscape. It sustains marine fisheries, coastal agriculture, biodiversity, transport corridors and settlements, while also serving as the final receiving system for rivers, wetlands and estuaries flowing from the Western Ghats through the state's ridge-to-sea landscape.

The risks facing Kerala's coast are intensifying and becoming more complex. Coastal erosion remains serious in many stretches, but coastal vulnerability today also includes tidal flooding, sea incursion, altered sediment flows, inlet instability, sea-level rise, storm impacts and saline intrusion. These processes are further aggravated by upstream river regulation, sand mining, drainage disruption, pollution and poorly planned coastal infrastructure.

These environmental changes directly affect the safety, livelihoods and settlements of fishing communities that depend on the coast. Coastal villages are experiencing erosion, loss of housing and land, unsafe harbour access, declining fishing days due to weather warnings, and disruption of customary fishing spaces and coastal commons. In recent years the coast has also faced increasing pressure from large infrastructure projects, maritime traffic and mineral sand extraction, which can alter sediment movement, destabilise beaches and intensify erosion if poorly regulated.

Recent public debates and community mobilisations across Kerala's coast - from Vizhinjam to Muthalappozhi - have highlighted the urgent need for coastal governance that protects both ecosystems and livelihoods. Protecting Kerala's coast therefore requires integrated river-coast planning, scientific monitoring of shoreline and sediment systems, climate adaptation for

tidal flooding and sea incursion, restoration of coastal ecosystems such as mangroves and wetlands, stronger preparedness for maritime pollution events, and explicit recognition of the rights and livelihood security of fishing communities.

What Kerala Should Do (Manifesto Commitments)

Coastal Governance and Scientific Monitoring

- Establish a **Kerala coastal and marine resilience mission** to coordinate shoreline protection, climate adaptation, fisher livelihood security, ecosystem restoration and disaster preparedness (including future sea-level rise) across departments.
- Adopt a **managed retreat and adaptive coastal planning** approach to develop voluntary relocation frameworks for vulnerable coastal communities; identify and notify 'No-Rebuild Zones' in high-risk erosion stretches; and ensure dignified transitions with full community consent and livelihood safeguards.
- Promote **integrated river-coast governance** recognising upstream river regulation, sand mining, wetland loss and drainage disruption as key drivers of coastal erosion and sediment change.

Scientific Monitoring & Data Systems

- Establish a **Kerala coastal observatory** to study and monitor coastal, tidal and shoreline changes, sediment dynamics, tidal flooding risks, marine pollution and coastal ecosystem health with

open access to scientific data.

- Adopt scientifically informed **sediment management strategies** addressing cumulative impacts of breakwaters, groynes, harbours and coastal infrastructure on shoreline stability.

Coastal Regulation, Spatial Planning & Rights-Based Governance

- Prepare **Coastal and Marine Spatial Plans (CMSP)** through participatory processes involving traditional fishing communities, local governments and scientific institutions to protect ecosystems and coastal communities and its livelihood, social and cultural spaces
- **Strictly enforce the Coastal Regulation Zone (CRZ)** Notification with timely detection and prosecution of violations through improved staffing in the authorities and availing digital shapefiles of Coastal Zone Management Plan.

Coastal Ecosystems and Natural Protection Systems

- Adopt **ecosystem-based coastal management** as the primary approach to shoreline protection.
- Declare a **Kerala coastal regeneration decade** to position the state as a leader in nature-positive coastal governance through community-led restoration of degraded coastal ecosystems (like beaches, sand dunes, mangroves, coastal wetlands, intertidal rocky reefs and estuaries) as natural buffers against disasters.

Coastal Land Use, Engineering & Development Controls

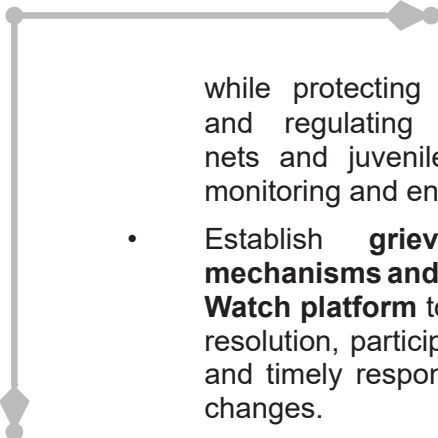
- Ensure coastal protection strengthens natural buffers rather than replacing them with poorly

designed hard structures; **treat seawalls, groynes and tetrapods as a last resort** after rigorous scientific and social assessment.

- Develop **region-specific beach management plans** based on geomorphology, erosion trends, biodiversity value and livelihood dependence.
- Ensure natural coastal processes, especially monsoon-driven sand movement, are maintained in harbour, port and coastal protection planning.
- **Abandon the proposal for the coastal highway** that would irreversibly damage fragile coastal ecosystems and livelihoods.

Fishing Community Rights, Settlements and Livelihood Security

- **Ensure Free, Prior and Informed Consent (FPIC)** of traditional coastal communities by recognising customary marine tenure and legally safeguarding access to beaches, fishing grounds and coastal commons through Coastal Commons Registers and rights-based planning frameworks.
- Recognise **coastal commons as living cultural landscapes** and designate landing centres, boat pathways, drying yards and traditional fish markets as cultural-ecological heritage spaces.
- Strengthen settlement safety and livelihood security through climate-resilient housing, social protection, insurance and compensation systems, accessible weather services and dignified safeguards for climate-displaced coastal communities.
- **Promote regenerative fisheries** and strictly enforce provisions of Kerala Marine Fishing Regulation Act, 1980 restricting mechanised fishing within 0–12 nautical miles,



while protecting marine habitats and regulating bycatch, ghost nets and juvenile catch through monitoring and enforcement.

- Establish **grievance redress mechanisms and a Citizen Ocean Watch platform** to support conflict resolution, participatory monitoring and timely response to ecological changes.

Harbours, Inlets and Fishing Access

- Ensure scientific monitoring and maintenance of harbour mouths, estuaries and fishing access channels, prioritising safety, navigational access, sediment stability and high-risk locations such as Muthalappozhi.
- Strengthen **harbour safety standards and early warning systems** while ensuring transparent, participatory review of ports and coastal infrastructure proposals.
- Mandate **cumulative ecological and social impact assessments** for coastal infrastructure and strictly regulate mining and tourism in fragile zones to prevent erosion and livelihood loss.

Maritime Accidents, Marine Pollution and Compensation

- **Strengthen maritime accident preparedness and coastal pollution response systems**, including monitoring for shipwreck contamination, oil spills and hazardous cargo incidents.
- Ensure independent scientific assessment of marine pollution events and **guarantee fair, timely compensation** for affected fishing communities.

Climate Resilience, Safety and Ocean Governance

- Develop **community-managed cyclone shelters** and early warning systems in vulnerable coastal zones and mandate inter-agency coordination among coastal police, fisheries rescue teams and the Coast Guard.
- Develop a **Sea Safety Protocol** co-designed with active sea-going fishers.
- Establish a **Fisher Occupational Fund** compensating weather-related non-working days.

Chapter 9

Ecology-sensitive Infrastructure and Monsoon-Responsive Engineering

Kerala is a monsoon state. Infrastructure that ignores monsoon hydrology will repeatedly fail.

Across the state, rainfall moves through a dense network of streams, wetlands, paddy fields and drainage channels before reaching rivers and the coast. Roads, railways, embankments and urban expansion can significantly alter these natural water pathways if drainage systems are blocked, narrowed or poorly designed.

Many recent infrastructure failures in Kerala arise from this basic mistake. When natural drainage is obstructed, the consequences appear across the landscape - flooding of settlements and paddy fields, slope instability, infrastructure damage and downstream ecological disruption. Recent flooding and structural failures associated with sections of the NH66 corridor and other linear infrastructure projects illustrate how inadequate attention to drainage systems can magnify disaster risks.

In a monsoon state, drainage is not a minor engineering detail. It is a core principle of public safety, flood resilience and ecological stability. Infrastructure planning must therefore ensure hydrological continuity, ecological compatibility and landscape-sensitive engineering.

What Kerala Should Do (Manifesto Commitments)

Monsoon Hydrology and Drainage Continuity

- Make **drainage continuity a non-negotiable design principle** for all major infrastructure projects including highways, railways, urban expansion and industrial development.
- Ensure that infrastructure design

maintains **uninterrupted natural drainage flows through adequate culverts, bridges, floodways and drainage corridors.**

- Map and protect **natural drainage systems, wetlands, floodplains and paddy landscapes** that function as water flow pathways during monsoon periods.
- Ensure that **infrastructure planning across departments incorporates hydrological modelling and landscape-scale drainage assessments.**

Ecological and Hydrological Screening of Infrastructure

- Introduce **mandatory hydrological and ecological screening at the planning stage of major infrastructure projects** to assess impacts on drainage systems, wetlands, floodplains and water flow patterns.
- Integrate these assessments into **project approval, design modification and environmental clearance processes.**
- Ensure that screening results and mitigation measures are **publicly disclosed to strengthen transparency and accountability.**

Ecological Infrastructure Safety Audits

- Establish **independent ecological infrastructure safety audits for major public works**, including highways, railways, embankments and urban infrastructure.
- Ensure **public disclosure of audit findings and mandatory corrective measures** where ecological risks or drainage disruptions are identified.

- Periodically review existing infrastructure to identify **drainage blockages, flood risks and structural vulnerabilities in monsoon conditions**.

Protecting Wetlands, Paddy Landscapes and Floodplains

- Avoid routing new linear infrastructure through **paddy lands, wetlands and floodplain landscapes** wherever possible.
- Where no viable alternative exists, ensure infrastructure is built on **viaducts or elevated structures that maintain water flow and ecological connectivity**.
- Ensure infrastructure projects do not **block flood buffering landscapes that protect settlements during extreme rainfall events**.

Wildlife Corridors and Ecological Passage

- Mandate that new and existing infrastructure integrate **wildlife crossings, corridor safeguards and ecological design standards** in forest and wildlife movement landscapes.
- Increase the use of **culverts, underpasses, canopy bridges and other crossing structures** to enable movement of large mammals and smaller fauna.
- Introduce **speed regulation, warning systems and ecological monitoring in forest stretches where roads intersect wildlife**

habitats.

- Use modern monitoring technologies, including **sensor systems and AI-enabled monitoring tools**, where appropriate, to reduce wildlife mortality along transport corridors.

Infrastructure in Hill and Landslide-Prone Landscapes

- Integrate **slope stability standards and landslide risk assessments** into approvals for hill infrastructure, tunnels and hill road design.
- Require **independent geotechnical and hydrogeological studies** before approving major infrastructure projects in landslide-prone areas.
- Avoid infrastructure alignments that **destabilise slopes, disrupt natural drainage or increase landslide risks in hill regions**.

Regulating Hill Cutting and Land Modification

- Regulate **hill cutting, slope modification and large-scale land levelling** through strict permitting and monitoring systems.
- Enforce **penalties and restoration requirements for violations that destabilise slopes or disrupt drainage systems**.
- Strengthen coordination between local governments, geological institutions and regulatory agencies to monitor **land-use changes in hill and midland landscapes**.

Chapter 10

Mining, Materials and Circular Economy

Kerala's growing demand for construction materials is driving ecological damage across the state. Quarrying and mining do not affect only isolated sites. Their impacts accumulate across landscapes, influencing hills, drainage systems, groundwater, biodiversity, settlements and public safety.

In Kerala, the real risk is often not a single quarry but the **density and clustering of quarries within already stressed landscapes**. State-level and district-level studies have repeatedly shown quarry proximity to drainage networks, habitation, forests, ESA villages and landslide-susceptible zones. This means that quarry regulation must move beyond site-by-site approval and address cumulative impacts at watershed, panchayat and taluk scale.

The problem is intensified by the rapid expansion of the construction sector. Construction demand has increased pressure on stone, sand, cement and steel, while unregulated expansion of buildings and infrastructure has increased ecological stress and material consumption. At the same time, Kerala has a large stock of vacant and underused houses, showing that new construction is not always aligned with actual social needs.

A responsible materials policy for Kerala must therefore do three things at once:

- **strictly regulate extraction,**
- **reduce demand for virgin materials, and**
- **shift the construction sector toward circular, resource-efficient and landscape-sensitive practices.**

What Kerala Should Do (Manifesto Commitments)

Mining Governance and Public-Interest Regulation

- Strengthen **public-interest oversight of mineral extraction** through transparent permitting, strict compliance monitoring, real-time public disclosure of key approvals and violations, and effective closure powers for illegal or non-compliant operations.
- Mandate **cumulative environmental and social impact assessments for quarry clusters** rather than treating each quarry as an isolated permit.
- Require **quarry-cluster assessment at watershed, panchayat or taluk scale**, including impacts on slope stability, drainage systems, groundwater, habitation, biodiversity and transport corridors.
- Introduce **density ceilings for quarrying in ecologically fragile or already overburdened regions**, especially in hill and midland landscapes where quarry concentration increases landslide and drainage risks.
- Require all quarry approvals and renewals to disclose whether the site lies within a **500 m cluster zone**, and ensure full EIA treatment where cumulative quarry area crosses the applicable threshold.

Buffer Norms, Safety Distances and No-Go Areas

- Replace weak and outdated siting norms with **stronger buffer standards for quarrying near settlements and sensitive assets**. Kerala should adopt a rule that is **no weaker than 200 m from residential buildings and other inhabited sites for blasting quarries, and 100 m for non-blasting quarries**, with larger context-specific distances

near schools, hospitals, anganwadis, drinking-water sources and densely settled areas.

- Enforce **minimum ecological buffers from rivers, canals, streams, springs, wetlands, reservoirs, agricultural lands, forests and wildlife movement areas**, with stricter exclusion norms in landslide-prone and hydrologically sensitive landscapes.
- Enforce ecological buffer norms between quarries and settlements, water bodies, forests, agricultural lands and public institutions, and regulate quarry blasting, dust emissions and transport impacts to reduce risks to public health and safety.
- Prohibit quarrying and laterite mining in **landslide-susceptible zones, Ecologically Sensitive Area villages, notified wetlands, major drainage corridors, forest buffers and densely inhabited hill slopes**.
- Make **independent geotechnical, hydrogeological and blasting-risk studies** mandatory for quarries proposed near settlements, water bodies or unstable slopes.

Compliance, Blasting Control and Closure

- Strengthen monitoring of **blasting, dust, vibration, fly-rock risk, noise, groundwater impacts and transport impacts**, with enforceable operating conditions and time-bound inspections. The High Court record in Kerala already shows that even the Pollution Control Board considered the older 50 m norm inadequate without stringent operational safeguards.
- Require quarry operators to maintain **environmental performance bonds** and site-restoration guarantees that can be forfeited for violations or abandonment.
- Ensure **mandatory phased closure and ecological restoration plans** for

exhausted and abandoned quarries, including slope stabilisation, drainage rehabilitation, fencing, revegetation and public safety measures. Kerala's district quarry mapping exercises themselves include restoration planning, which should now become mandatory regulation rather than an afterthought.

- Create district-level public registers of **active, suspended, expired and abandoned quarries**, including compliance status, EC status and restoration obligations.

Regulating Sand and Other Construction Minerals

- Strengthen regulation of **river sand, ordinary earth and other construction minerals** through scientific auditing, extraction limits, independent oversight and strict enforcement against illegal mining. Kerala's sand-audit framework already provides a base for this and should be strengthened rather than diluted.
- Require all significant sand and soil removal operations in hydrologically sensitive zones to be governed by **independent expert oversight**, balancing flood management with ecological protection and biodiversity safeguards. The recent High Court intervention on Thottappally points exactly in this direction.
- Promote **manufactured sand and other substitutes** only under strict dust-control, siting and pollution norms, so that one environmental problem is not replaced by another.

Reducing Demand for Virgin Materials

- Reduce demand for virgin construction materials through **construction and demolition waste recycling, reuse of recovered materials, on-site segregation and secondary materials markets**. Kerala's own waste policy framework already supports reuse and value addition of C&D waste and should

be operationalised much more aggressively.

- Make **C&D waste management plans mandatory** for large public and private construction projects, including reuse targets, disposal protocols and prohibition of dumping in wetlands, rivers and vacant land.
- Encourage **adaptive reuse, repair and renovation of existing buildings and housing stock**, especially in districts with large numbers of vacant or underused houses, so that construction demand is aligned with social need rather than speculative expansion.
- Reform building approval systems so that large new projects must demonstrate **material efficiency, reuse potential and alternatives to unnecessary excavation and virgin material use**.

Alternative Materials and Climate-Responsive Construction

- Promote the use of **low-impact, locally appropriate building materials** such as bamboo, stabilised earth blocks, compressed mud blocks and other climate-responsive materials where technically suitable.
- Support **research, testing, training, certification and standard-setting** to enable wider adoption of sustainable building materials and non-conventional building systems.
- Encourage architectural and engineering practices that reduce embodied material demand through **resource-efficient design, modular construction, adaptive reuse and passive climate design**.

Ecological Planning and Public Procurement

- Integrate **ecological carrying capacity and material-demand considerations** into land-use planning and building approvals, especially in fragile landscapes such as hill slopes, wetlands, river corridors and coastal areas.
- Reform public procurement so that **government construction prioritises recycled materials, low-carbon materials, resource-efficient design and C&D waste reuse**. Kerala's own policy direction on circular economy and C&D waste provides enough basis to begin this shift now.
- Recognise the construction sector as a major driver of **energy use, water consumption, emissions and landscape degradation**, and align its regulation with ecological sustainability goals.

Institutional Architecture

- Establish a **Sustainable Materials and Construction Regulation Programme** under the Climate Action and Resilience Mission to facilitate quarry regulation, quarry-cluster assessment, buffer norms, restoration obligations, circular construction systems, alternative materials and material-demand reduction.
- Create a standing **state-level expert panel on quarry regulation and construction materials** with representation from geology, hydrology, disaster management, public health, local governments and civil society to periodically review buffer norms, no-go areas and cumulative impact thresholds.

Chapter 11

Urban Ecology, Heat Resilience and Green Cities

Kerala is one of the most urbanised states in India, but its urbanisation is dispersed rather than concentrated in a few large metropolitan centres. A dense network of municipalities, towns and rapidly growing settlements now forms a continuous urban-rural landscape across much of the state. In this pattern of development, housing, roads, commercial expansion and infrastructure increasingly intersect with rivers, wetlands, hill slopes, coastal ecosystems and agricultural lands.

This pattern of growth is intensifying several environmental risks. Wetlands and drainage channels are being filled or narrowed, reducing natural flood buffering capacity. Urban tree cover is declining even as temperatures rise and heat stress becomes more frequent. Impervious surfaces such as concrete and asphalt are expanding, worsening stormwater runoff and urban flooding. In several Kerala towns, even moderate rainfall now produces flash flooding because traditional drainage networks, canals and low-lying wetlands that once absorbed stormwater have been filled, narrowed or encroached. Rivers, canals and backwaters flowing through towns are often degraded by sewage discharge, solid waste dumping and unregulated construction along their banks.

At the same time, Kerala's towns still retain important ecological assets: urban wetlands, ponds, canals, tree-lined streets, homestead vegetation, gardens and small patches of urban wilderness. These systems function as natural infrastructure. They regulate temperature, absorb rainfall, recharge groundwater, support biodiversity and contribute to public health and quality of life.

Urban planning in Kerala must therefore move beyond conventional infrastructure-

led expansion and adopt **ecological urbanisation**, where cities and towns are designed as climate-resilient and environmentally balanced living systems. Protecting and expanding urban tree cover, safeguarding blue-green networks, addressing rising heat stress and ensuring humane management of urban animals must become integral components of urban governance.

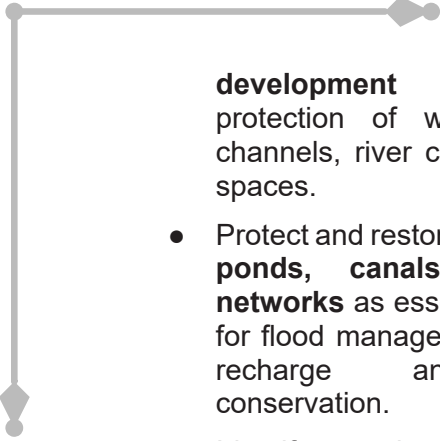
What Kerala Should Do (Manifesto Commitments)

Urban Tree Protection and Canopy Expansion

- Enact a **Kerala Urban Tree Protection and Canopy Expansion Act** to protect mature urban trees, regulate tree removal and promote large-scale canopy restoration across towns and cities.
- Establish **scientifically determined urban canopy cover targets** for municipalities and corporations, ensuring that urban development does not reduce existing tree cover and progressively expands it.
- Protect and restore **roadside tree avenues, green corridors and neighbourhood tree belts** that reduce urban heat stress and improve air quality.
- Require **compensatory planting and long-term maintenance commitments** for any unavoidable removal of mature trees in urban infrastructure projects.

Protecting Urban Blue-Green Networks

- Integrate **ecological safeguards into urban masterplans and**



development plans, ensuring protection of wetlands, drainage channels, river corridors and green spaces.

- Protect and restore **urban wetlands, ponds, canals and drainage networks** as essential infrastructure for flood management, groundwater recharge and biodiversity conservation.
- Identify and conserve **urban wilderness patches, hillocks and biodiversity pockets** within cities and towns as ecological refuges and public green spaces.
- Protect **homestead vegetation, urban gardens and community green spaces**, recognising their role in food security, biodiversity and neighbourhood cooling.

Urban Heat Resilience

- Develop and implement **Urban Heat Action Plans** for major cities and towns, integrating tree canopy expansion, shaded public spaces, cooling infrastructure and early warning systems for heat waves.
- Expand **shaded pedestrian networks, public parks, water bodies and cooling shelters** to protect vulnerable populations during extreme heat events.
- Promote **passive cooling architecture and climate-responsive building design**, including natural ventilation, shaded streetscapes, reflective roofs, tree cover and building orientation, to reduce dependence on air-conditioning and lower electricity demand.
- Promote **climate-responsive urban design**, including permeable surfaces, green roofs, shaded streets and passive cooling architecture.
- Mandate **energy-efficient and water-sensitive standards for large buildings**, beginning with public buildings and major commercial developments.

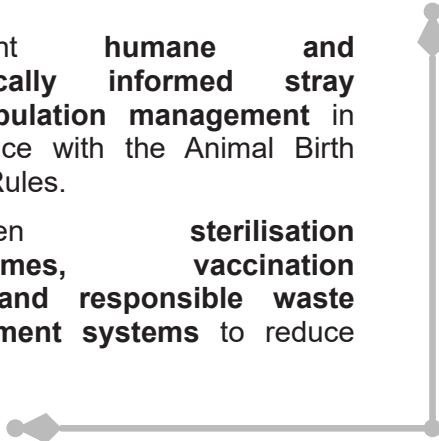
Stormwater Management and Urban Flood Prevention

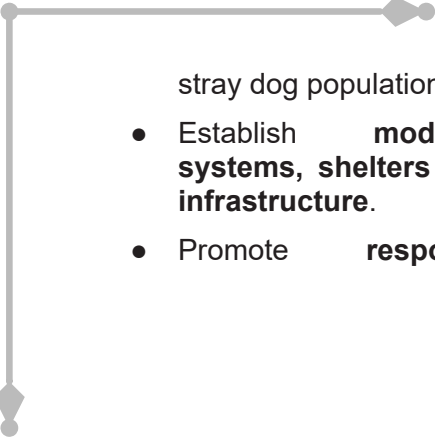
- Integrate **stormwater management with natural drainage systems**, ensuring that urban infrastructure does not block or divert natural water pathways.
- Restore and maintain **urban canals, stormwater drains and flood channels** that have been encroached upon or degraded.
- Prevent **encroachments into wetlands, drainage channels and floodplains**, and strengthen monitoring and enforcement mechanisms.
- Promote **permeable surfaces, rain gardens, urban wetlands and decentralised water retention systems** to reduce runoff and improve groundwater recharge.

Urban Biodiversity and Ecological Governance

- Require municipalities and corporations to prepare **Urban Biodiversity Registers and ecological management plans** to guide environmental protection.
- Establish **urban ecological monitoring systems** covering tree cover, wetlands, biodiversity and heat indicators.
- Encourage collaboration between **local governments, research institutions and community organisations** for urban ecological restoration.

Humane Urban Animal Management

- Implement **humane and scientifically informed stray dog population management** in accordance with the Animal Birth Control Rules.
 - Strengthen **sterilisation programmes, vaccination drives and responsible waste management systems** to reduce
- 



stray dog population growth.

- Establish **modern rescue systems, shelters and veterinary infrastructure.**
- Promote **responsible pet**

ownership, adoption programmes and community awareness campaigns to reduce human–animal conflict while ensuring animal welfare.

Chapter 12

Waste, Plastics and Pollution Control

Kerala has made important progress in decentralised waste management through initiatives led by local self-governments and institutions such as the Suchitwa Mission and Haritha Keralam Mission. Source segregation, community-based collection systems, green protocols and decentralised processing models have demonstrated that waste governance can work when supported by strong local institutions and active public participation.

However, major challenges remain. Plastic pollution continues despite regulatory bans and awareness campaigns. Specialised waste streams such as biomedical waste, e-waste, sanitary waste and construction waste require stronger compliance systems and monitoring. Incidents such as the Brahmapuram landfill fire have exposed the risks of mixed waste accumulation, poorly managed legacy dumps and weak enforcement of waste management rules. These incidents highlight the need for stronger data-driven planning, transparent monitoring systems and clear accountability in waste governance.

Waste governance must therefore move beyond awareness campaigns and fragmented programmes toward a stronger regulatory framework based on waste reduction, circular material flows and pollution prevention. The next phase of reform must strengthen decentralised systems, eliminate mixed waste dumping, enforce plastic reduction and Extended Producer Responsibility, and ensure credible environmental regulation supported by transparent monitoring and accountability.

What Kerala Should Do (Manifesto Commitments)

Strengthening Decentralised Waste Management Systems

- Consolidate Kerala's decentralised waste management model by establishing **statewide service standards for waste segregation, collection, processing and safe management of residual waste**, ensuring that no local government depends on mixed-waste dumping.
- Strengthen **local government waste management infrastructure**, including material recovery facilities, decentralised composting systems and safe residual waste handling.
- Provide **technical, financial and institutional support to Haritha Karma Sena and other local waste management systems**, including worker protections, fair remuneration and improved operational systems.
- **Upgrade Haritha Karma Sena's to Eco-Services and management enterprises** through a Social Enterprise framework. **Eliminating Mixed Waste and Managing Legacy Dumps**
- Implement **scientific management of residual waste and legacy dumps**, including fire prevention systems, leachate control, environmental safeguards and emergency response protocols.
- Phase out large mixed-waste dumping sites and **transform legacy dumps into scientifically managed resource recovery parks and ecological restoration zones**.
- Establish **strict monitoring systems for landfill safety, methane emissions and groundwater contamination**.

Plastic Reduction and Extended Producer Responsibility

- Enforce **plastic reduction measures and Extended Producer Responsibility (EPR)** through measurable compliance systems for producers, brand owners, retailers and bulk consumers.
- Strengthen enforcement of **plastic bans, carry-bag restrictions and single-use plastic reduction measures** across markets, institutions and public spaces.
- Require producers and distributors to support **collection, recycling and safe disposal systems for plastic packaging and multi-layered plastics**.

Regulating Specialised Waste Streams

- Strengthen regulatory systems for **biomedical waste, e-waste, sanitary waste and construction and demolition waste**, ensuring authorised collection, transport, treatment and monitoring.
- Ensure that **healthcare institutions, industries, electronic retailers and construction companies comply with waste management rules and reporting requirements**.
- Promote safe disposal systems for **household hazardous waste streams such as batteries, chemicals and electronic waste**.
- Specifically promote Start-ups in the **biomedical waste, e-waste, sanitary waste and construction and demolition waste** collection and management.

Green Protocol and Waste Reduction at Source

- Expand and strictly enforce **Green Protocol practices and sustainable procurement standards** across public institutions, events, tourism zones, markets and government programmes.

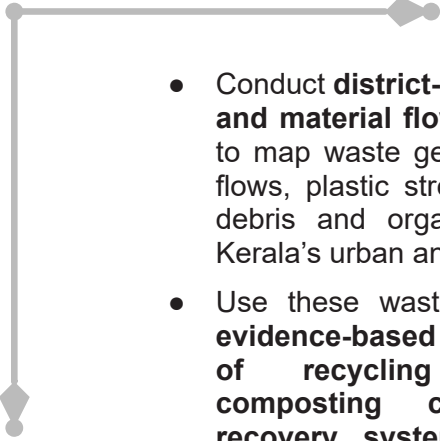
- Encourage **waste reduction at source**, including reusable systems, refill models, sustainable packaging and bulk procurement.
- Integrate waste reduction principles into **tourism management, public events and hospitality sectors**.

Strengthening Pollution Control and Environmental Enforcement

- Reform and strengthen the **Kerala State Pollution Control Board** through improved staffing, laboratories, inspections, monitoring systems and credible enforcement powers.
- Establish a **State Air Quality Management Programme** covering urban centres, industrial clusters and construction corridors, with continuous monitoring, public reporting of air quality data, and strict regulation of vehicular emissions, construction dust, quarry dust and industrial pollution sources.
- Strengthen enforcement of **noise pollution regulations** in urban, peri-urban and rural areas, including limits on construction noise, quarry blasting, traffic, loudspeakers and festival sound systems, supported by real-time monitoring, public complaint systems and strict penalties for violations.
- Ensure **public disclosure of pollution data**, including waste management compliance, industrial emissions and water quality monitoring.
- Introduce **stronger penalties and closure powers for repeated violations of environmental and waste management regulations**.

Circular Economy, Waste Audits and Pollution Prevention

- Promote **circular material systems** through recycling markets, secondary material use and innovation in waste-to-resource technologies.

- 
- Conduct **district-level waste audits and material flow analyses (MFA)** to map waste generation, recycling flows, plastic streams, construction debris and organic waste across Kerala's urban and rural regions.
 - Use these waste audits to guide **evidence-based planning of recycling infrastructure, composting capacity, plastic recovery systems and circular material markets.**
 - Support research, innovation and entrepreneurship in

plastic alternatives, recycling technologies and circular economy systems.

- Establish a **Zero Waste and Pollution Prevention Programme under the Climate Action and Resilience Mission** to facilitate actions on waste reduction, plastic control, circular economy initiatives, waste audits and pollution monitoring across sectors.

Chapter 13

Travel, Tourism and Ecological Carrying Capacity

Kerala's forests, hill stations, rivers, backwaters, farms and coastal landscapes are increasingly being converted into tourism destinations. While tourism contributes to livelihoods and the state economy, unmanaged tourism can degrade the very ecosystems and cultures that attract visitors in the first place.

Kerala's natural landscapes were historically accessible and relatively pristine. But in recent years tourism pressure has expanded rapidly beyond traditional destinations into panchayats, agricultural landscapes, forest fringes and small towns. Social media promotion, travel vloggers and viral destination marketing can suddenly transform quiet landscapes into high-footfall visitor sites. Places such as Kollengode and several locations in Wayanad illustrate how small communities can quickly become inundated with vehicles, crowds, noise and waste, disrupting daily life for residents and overwhelming local infrastructure. Tourism cannot be allowed to turn Kerala's landscapes into disposable backdrops for social media consumption.

This pattern has already been seen in major tourism regions. Munnar, Eravikulam National Park, parts of Wayanad and several hill destinations have experienced severe visitor pressure, traffic congestion, waste accumulation and ecological damage. In many cases, regulation has occurred only after ecological damage or court interventions forced the government to act.

Carrying capacity refers to the level of visitor activity that an ecosystem or destination can sustain without ecological damage, infrastructure stress, cultural disruption or loss of local livelihoods. For Kerala, this principle is no longer theoretical. Tourism policy must recognise that not every landscape can or should become a tourism

destination. Agricultural districts, forest-edge settlements and ecologically fragile hills cannot be converted into tourism zones without undermining their primary ecological and livelihood functions.

Tourism responsibility does not lie only with governments and host communities. Visitors must also recognise that Kerala's landscapes, villages and cultural spaces are living environments, not recreational playgrounds. If Kerala presents itself to the world as "God's Own Country", visitors must behave with ecological sensitivity, cultural respect and consideration for local communities. Responsible travel therefore requires clear visitor education and orientation even before tourists arrive in the state, so that travel behaviour aligns with Kerala's environmental and social values.

Kerala pioneered the concept of Responsible Tourism and has made significant efforts to link tourism with local communities and livelihoods. However, the next phase must move beyond voluntary frameworks toward science-based regulation, destination governance and enforceable ecological limits. Tourism must remain economically beneficial while becoming ecologically disciplined, culturally respectful and socially responsible to the communities that host visitors.

What Kerala Should Do (Manifesto Commitments)

Establishing Ecological Carrying Capacity

- Establish **science-based carrying capacity limits** for fragile destinations including hill stations, forest-edge landscapes, waterfalls, wetlands, river corridors, backwaters and coastal belts.

- Introduce **seasonal visitor caps, vehicle limits and activity restrictions** in destinations where ecological thresholds or infrastructure limits are exceeded.
- Make **carrying-capacity assessment mandatory** before promoting new tourism destinations or expanding visitor infrastructure.
- Ensure tourism expansion aligns with **water availability, waste management capacity, hazard risk and ecological sensitivity**.

Protecting Communities from Tourism Pressure

- Recognise that tourism can impose **daily nuisance costs on local communities**, including traffic congestion, noise pollution, crowding, waste dumping and disruption of livelihoods.
- Introduce **community-based visitor management systems** in destinations facing crowd pressure, including vehicle restrictions, parking regulation and designated visitor zones.
- Ensure **Gram Panchayat consent and public consultation** before promoting or expanding tourism in rural areas.
- Establish grievance and monitoring systems enabling local residents to **report tourism-related violations, nuisance and environmental damage**.

Preventing Tourism Sprawl in Agricultural and Fragile Landscapes

- Ensure that **agricultural districts and productive farming landscapes are not converted into tourism-dominated economies**, particularly in ecologically sensitive regions such as Wayanad.
- Prevent misuse of **agri-tourism as a mechanism for land conversion or resort development**.

- Prohibit tourism expansion in **wetlands, riverbanks, steep slopes, forest buffers and other fragile ecological landscapes**.
- Subject tourism proposals in hill districts to **strict scrutiny based on landslide risk, water availability and cumulative ecological impact**.

Visitor Management and Infrastructure Discipline

- Introduce **permission-based visitor management systems** in high-pressure destinations including timed entry, advance booking and vehicle caps.
- Restrict private vehicle access in congested destinations and promote **public transport or shuttle-based access systems**.
- Link tourism licensing to **mandatory waste, sewage, water and energy management standards**.
- Ensure tourism infrastructure does not **block drainage channels, degrade water bodies or destabilise slopes**.

Visitor Education and Responsible Travel Behaviour

- Establish a **Kerala Responsible Visitor Code** outlining ecological, cultural and community-sensitive behaviour expected from visitors across destinations.
- Introduce **pre-arrival visitor orientation systems** through tourism websites, booking platforms, airlines, tour operators and accommodation providers explaining Kerala's environmental rules, waste norms, cultural etiquette and community sensitivities.
- Require all licensed tourism establishments to **communicate visitor guidelines on waste disposal, plastic use, noise levels, wildlife disturbance, cultural conduct and respect for local communities**.

- Promote **public awareness campaigns for responsible travel behaviour**, emphasising respect for local livelihoods, agricultural landscapes, sacred spaces and fragile ecosystems.
- Develop **destination interpretation systems** - visitor centres, signages, digital guides and trained local guides - that educate tourists about local ecology, culture and conservation responsibilities.

Waste, Water and Environmental Performance

- Enforce **zero-waste and plastic-free tourism zones** through strict compliance systems and local waste management infrastructure.
- Require tourism establishments to implement **source segregation, wastewater treatment, water conservation and plastic reduction systems**.
- Establish **destination-level water budgets and waste monitoring systems** in tourism-intensive regions.

Strengthening Responsible and Regenerative Tourism

- Reorient Responsible Tourism toward **regenerative tourism**, ensuring tourism contributes to ecological restoration, cultural protection and local livelihoods.
- Support **local food systems, crafts, community enterprises and cultural activities** that strengthen local economies without damaging ecosystems.
- Ensure tourism models do not encourage **land speculation, resort sprawl or elite capture of landscapes and commons**.

Climate Risk and Hazard Governance

- Integrate **landslide risk, flood risk, heat stress and water scarcity** into tourism planning and licensing.
- Prohibit tourism infrastructure in **high-risk landslide and flood-prone zones** unless rigorous scientific assessment confirms safety.
- Require tourism destinations to maintain **hazard preparedness systems including evacuation routes, emergency communication and rescue access**.

Institutional Reform and Monitoring

- Establish **Destination Management Authorities or empowered local governance systems** for major tourism zones with transparent public reporting.
- Publish **district-level tourism ecology reports** tracking visitor numbers, waste loads, water use, ecological violations and compliance status.
- Introduce **destination ecology levies** in high-pressure zones to fund sanitation, waste management, ecological restoration and local safety infrastructure.
- Establish a **Sustainable and Regenerative Tourism Programme** under the Climate Action and Resilience Mission to coordinate carrying capacity regulation, destination governance, waste systems and ecological monitoring.
- Launch a **Responsible Travel Communication Programme** under the Tourism Department and Responsible Tourism Mission to promote ethical visitor behaviour, ecological awareness and community-sensitive tourism practices through digital platforms, travel advisories and global tourism partnerships.

Chapter 14

Energy Transition and Climate Mitigation

Kerala's energy future must align with both climate realities and ecological limits. The state currently relies heavily on electricity imported from fossil fuel-based generation outside its borders, even as its own renewable energy potential remains underutilised.

At the same time, electricity demand is rising due to urbanisation, cooling requirements, digital infrastructure, electric mobility and expanding economic activity. Without careful planning, this demand could deepen dependence on fossil-based power and increase energy insecurity.

Increasing temperatures and heat stress have led to rapid growth in air-conditioning and cooling demand across households, commercial buildings and public infrastructure. This growing dependence on cooling is now a major driver of electricity demand and contributes to urban heat island effects, creating a feedback loop between rising temperatures and energy consumption.

Rooftop solar expansion is also changing Kerala's electricity demand pattern. Daytime solar generation has reduced demand from the grid during daylight hours, while rising air-conditioning use has significantly increased evening electricity demand, particularly during summer months. Managing this emerging evening peak will require a combination of storage systems, demand-side management and time-sensitive electricity use patterns.

Kerala's energy transition must therefore advance through four complementary pillars: expanding renewable energy generation, strengthening energy storage and grid resilience, reducing energy demand through efficiency and conservation, and transforming transport and mobility systems to reduce fossil fuel dependence.

The state also has to ensure that renewable expansion does not create new ecological risks. Large dams, coal or thermal power plants and nuclear installations carry significant environmental and social impacts that are incompatible with Kerala's fragile landscapes. Instead, the transition should prioritise decentralised renewable systems, distributed generation, smart grids and energy-efficient infrastructure.

Kerala's energy pathway must therefore accelerate renewable deployment while reducing fossil dependence and improving energy efficiency across all sectors of the economy.

What Kerala Should Do (Manifesto Commitments)

Renewable Energy Expansion

- Accelerate renewable energy expansion through **rooftop solar, public-sector solar installations, community solar projects and decentralised renewable systems** across urban and rural areas.
- Promote **solarisation of government buildings, schools, hospitals, public institutions and local government infrastructure.**
- Encourage **solar adoption in residential buildings, housing complexes, commercial establishments and industries** through incentives and simplified regulatory systems.
- Promote **rooftop solar systems integrated with battery storage and smart inverters**, enabling households and institutions to store daytime solar energy and reduce evening peak demand.
- Promote **solar-powered EV charging infrastructure integrated**

with rooftop solar and battery storage.

- Accelerate **solarisation of public infrastructure**, including water supply systems, pumping stations, irrigation systems and street lighting.
- Promote **solar-powered agricultural pumps and irrigation systems**, reducing electricity demand from the grid and improving resilience for farmers.
- Explore **offshore wind, hybrid renewable systems and floating solar projects** where ecologically appropriate and technically viable.

Energy Storage and Grid Resilience

- Deploy **Battery Energy Storage Systems (BESS)** and other storage technologies to stabilise renewable supply, manage peak demand and improve grid resilience.
- Address emerging **evening peak electricity demand caused by solar generation patterns and increased cooling loads**, through battery storage systems, demand-side management and time-of-day electricity pricing.
- Modernise electricity grids to integrate **distributed renewable generation, storage systems and smart grid technologies**.
- **Strengthen and expand time-of-day electricity tariffs and demand-side management programmes**, encouraging electricity use during solar generation hours and reducing evening peak demand.
- Strengthen transmission and distribution infrastructure to support **two-way energy flows from decentralised renewable systems**.

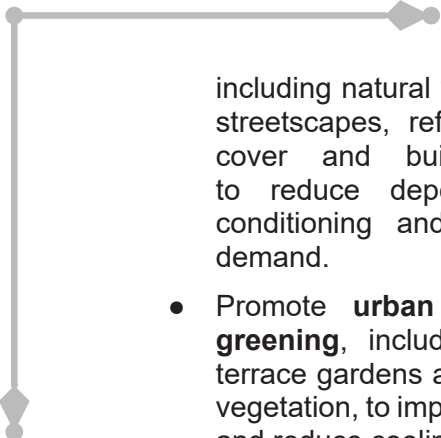
Reducing Fossil Dependence

- Reduce Kerala's dependence on **coal-based electricity imports** through accelerated renewable deployment and demand-side management.

- Avoid new **coal or thermal power plants, environmentally disruptive large dam projects and nuclear power installations** in the state.
- Prioritise **clean energy procurement strategies** that favour renewable electricity.

Energy Efficiency and Demand Reduction

- Implement a **statewide energy efficiency and conservation programme** covering buildings, public infrastructure, agriculture, transport and industry.
- Conduct **statewide energy audits for government institutions, industries and large commercial consumers** to identify efficiency improvements and reduce energy demand.
- Promote **energy-efficient building design, appliances and infrastructure** through regulatory standards, incentives and building codes.
- Promote **energy-efficient cooling systems, high-efficiency air conditioners and passive cooling architecture** to reduce electricity demand during peak evening hours.
- Encourage **localised economic systems and village-level self-reliance in essential services and livelihoods**, reducing unnecessary transport demand and energy consumption.
- Promote **biogas systems and clean cooking solutions**, including household biogas plants and improved smokeless cooking technologies alongside LPG access.
- Encourage **energy-efficient building design for all building sizes**, including small residential houses, through building codes, incentives and awareness programmes.
- Promote **passive cooling architecture and climate-responsive building design**,



including natural ventilation, shaded streetscapes, reflective roofs, tree cover and building orientation, to reduce dependence on air-conditioning and lower electricity demand.

- Promote **urban and household greening**, including tree planting, terrace gardens and neighbourhood vegetation, to improve microclimates and reduce cooling demand.
- Promote **energy literacy and responsible electricity consumption** through public awareness programmes, smart-meter feedback systems and consumer education.

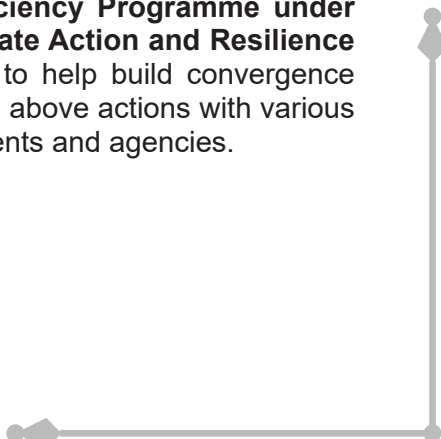
Sustainable Transport and Energy Demand Reduction

- Promote **integrated transport planning** that prioritises rail-based passenger mobility, particularly strengthening north-south rail connectivity as the backbone of long-distance travel. Review present new rail proposals from a socio-economic, ecological and hydrological evaluations as suggested in Chapter 9.
- Develop **last-mile road connectivity and feeder public transport systems from railway stations** to reduce dependence on private vehicles and long-distance road transport.
- Expand **water-based passenger and freight transport where environmentally and economically feasible**, especially in coastal and backwater regions.
- Strengthen **affordable and reliable public transport systems**, including bus, rail and water transport networks, to reduce fossil fuel consumption and traffic congestion.

Clean Energy in Public Infrastructure and Mobility

- Use **public-sector leadership and procurement policies** to accelerate the transition to renewable energy and energy-efficient technologies.
- Ensure that **government buildings, schools, hospitals and public institutions progressively adopt rooftop solar and energy-efficient systems**, demonstrating leadership in the energy transition.
- Promote **electric mobility for public transport, municipal fleets and government vehicles**, supported by renewable-powered charging infrastructure.
- Encourage integration of **renewable energy systems in water supply, irrigation, public lighting and public infrastructure systems**.

Institutional Coordination

- Establish an **Energy Transition and Efficiency Programme under the Climate Action and Resilience Mission** to coordinate renewable deployment, energy efficiency, storage systems, demand management and grid modernisation across government departments and agencies.
 - Promote collaboration between **energy utilities, research institutions, industry and local governments** to support innovation and implementation of clean energy technologies.
 - Establish an **Energy Transition and Efficiency Programme under the Climate Action and Resilience Mission** to help build convergence on all the above actions with various departments and agencies.
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Chapter 15

Climate Risk, Displacement and Rights-Based Rehabilitation

Kerala is entering an era of increasing climate and ecological risk. Extreme rainfall, floods, landslides, coastal erosion, tidal flooding and heat waves are becoming more frequent and intense. Many communities also live in persistently vulnerable areas such as landslide-prone slopes, floodplains, erosion-affected coasts and regions facing severe human–wildlife conflict.

Recent tragedies such as the Mundakkai-Chooralmala landslide in Wayanad, the earlier Puthumala disaster and the 2018 floods reveal a major governance gap. While rescue operations are often swift, long-term rehabilitation and resettlement remain slow and largely ad hoc. Many families spend years in temporary shelters or return to unsafe locations because permanent solutions are delayed.

The problem extends beyond sudden disasters. Communities in high-risk landscapes-including landslide-prone hills, erosion-affected coasts and wildlife-conflict zones-often face repeated losses without structured relocation options.

Kerala therefore needs a framework that **treats rehabilitation and resettlement not as discretionary relief or charity** but as a **legal right and public responsibility**. It must support communities displaced by disasters, climate risks and ecological vulnerabilities while enabling voluntary relocation from high-risk areas.

This framework should ensure secure housing, livelihood restoration, financial recovery and access to health care, education and essential services. It must also recognise the growing reality of **climate displacement**, where communities can no longer safely remain in repeatedly hazardous areas.

Kerala should therefore establish a statutory framework- similar in principle to the **Right**

to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement (LARR) Act, 2013 - that guarantees time-bound, rights-based rehabilitation and resettlement.

The state must also develop mechanisms to assess and finance **loss and damage** from climate impacts. Post-disaster assessments after the 2018 floods and recent landslides show that these costs are substantial and long-lasting. Addressing them requires institutional reform, dedicated financing and community-centred recovery systems that enable affected people to rebuild their lives with dignity and security.

What Kerala Should Do (Manifesto Commitments)

Ecological Vulnerability and Climate Risk Rehabilitation and Resettlement Act

- Enact a **Kerala Ecological Vulnerability and Climate Risk Rehabilitation and Resettlement Act**, modelled on the principles of the LARR Act, to guarantee time-bound compensation, rehabilitation and resettlement for communities displaced by disasters, climate risks or ecological hazards.
- Ensure that the Act covers relocation arising from **floods, landslides, coastal erosion, climate displacement, human–wildlife conflict zones, landslide-prone landscapes and other high-risk ecological areas**.

Planned Relocation from High-Risk Areas

- Identify settlements located in **high-risk landslide zones, floodplains, erosion-prone coasts and conflict-prone wildlife landscapes**.

- Develop **voluntary and participatory relocation programmes** enabling communities to move to safer locations with secure housing, land tenure and livelihood opportunities.

Livelihood and Financial Recovery

- Provide livelihood rehabilitation support for **forest-dwellers, farmers, fisher communities, plantation workers and other affected groups**.
- Introduce financial recovery mechanisms including **loan restructuring, compensation for livelihood losses and support for livelihood transition where necessary**.

Climate Loss and Damage Financing

- Establish a **Kerala Climate Loss and Damage Fund** to finance rehabilitation, relocation, livelihood restoration and reconstruction after climate disasters.
- Ensure **transparent monitoring** of compensation, rehabilitation progress and fund utilisation with community participation.

Institutional and Community Oversight

- Establish dedicated institutional mechanisms to oversee rehabilitation and resettlement programmes and ensure **time-bound implementation and grievance redress**.
- Ensure affected communities are **actively involved in planning and implementing rehabilitation and relocation programmes**.

PART III

Governance Architecture, Reforms, Finance and Accountability

The ecological transition proposed in this Charter cannot be delivered through isolated schemes or short-term administrative initiatives. It requires institutions that can coordinate across sectors, transparent and accountable decision-making, credible regulation, and sustained public investment. Environmental protection must therefore be embedded within governance systems that operate across departments, levels of government and political cycles.

Kerala's ecological challenges are deeply interconnected. Agriculture affects soil health, water flows and biodiversity. Forests and hill landscapes influence rivers, groundwater recharge and slope stability. Rivers shape wetlands and coastal dynamics. Infrastructure alters drainage systems and flood risks. Urban growth intensifies heat stress, waste generation and water demand. Mining affects slopes, groundwater and settlements. Tourism and coastal development affect fragile ecosystems and community livelihoods. These are not separate policy problems. They are linked outcomes of how Kerala governs development across its ridge-to-sea landscape.

Kerala already has some elements of an ecological governance framework:

the Department of Environment and Climate Change, Kerala State Action Plan on Climate Change 2.0, local climate adaptation planning processes, the Haritha Keralam and Suchitwa Mission experience, the Rebuild Kerala approach to resilience, the Environment Budget, the Land Use Department and Land Resources Information Systems (LRIS 2.0), and a growing ecosystem of scientific institutions and geospatial platforms. What is missing is not a total absence of institutions, but a coherent architecture that aligns them, fills the gaps, disciplines public investment and translates sectoral commitments into long-term public policy.

Part III therefore sets out the institutional, legal, planning, data and financing reforms required to implement the commitments in Parts I and II. It focuses on four linked tasks:

- climate governance architecture and institutional convergence
- land-use policy and spatial planning reform
- environmental data transparency and public oversight
- financing systems aligned with ecological restoration and climate resilience

Chapter 16

Environment and Climate Governance Architecture

Climate action fails when it is treated as a stand-alone programme rather than as a governing principle for development. In Kerala, climate risks and ecological limits must shape decisions in finance, planning, agriculture, water management, infrastructure, industry, tourism, urban governance and local administration.

Kerala therefore requires a climate governance architecture that can build convergence across departments while respecting the implementation role of line departments, statutory authorities and local governments. The purpose of such an architecture is not to build another disconnected bureaucracy. It is to ensure that climate mitigation, adaptation, resilience-building and ecological safeguards are integrated into the state's routine systems of planning, budgeting, approval and review.

The **Climate Action and Resilience Mission** proposed in this Charter should function as a **high-level mission to build convergence, and enable screening, budgeting and accountability across sectors**. It should complement the role of the Kerala State Disaster Management Authority, the State Planning Board, the Finance Department, the Local Self Government Department and other sector departments. Kerala already has climate-related plans and programmes; what is needed is a system that aligns them within a common framework for climate-risk reduction and ecological resilience.

The governance architecture should also distinguish between a small number of cross-sector missions that require dedicated convergence authority, and a wider set of programmes that can be implemented through existing departments once planning, budgeting and screening rules are changed.

What Kerala Should Do (Manifesto Commitments)

Kerala Climate Action and Resilience Mission

- Establish a **Kerala Climate Action and Resilience Mission** with the mandate to integrate climate action into planning, budgeting, investment appraisal and implementation across sectors.
- Ensure that the Mission works in close coordination with the **State Planning Board, Finance Department, Local Self Government Department, KSDMA, DoECC and other line departments**, so that climate and ecological considerations influence real decision-making rather than remain advisory. Kerala's existing climate-planning work through SAPCC 2.0 and LSG-level processes provides a foundation that should be scaled and institutionalised.
- Define the Mission's role clearly as **coordinating, building convergence, climate-risk screening, ecological budgeting, target-setting, implementation tracking and public accountability**, while sector departments continue to implement sectoral programmes.
- Place the Mission at a sufficiently high level of government to ensure effective convergence across departments and to influence project approvals, budget processes and planning frameworks.

Institutional Convergence

- Institutionalise cross-sector convergence so that **agriculture, water, forests, fisheries, energy,**

infrastructure, industry, tourism, urban development and local governance operate with shared climate and ecological objectives.

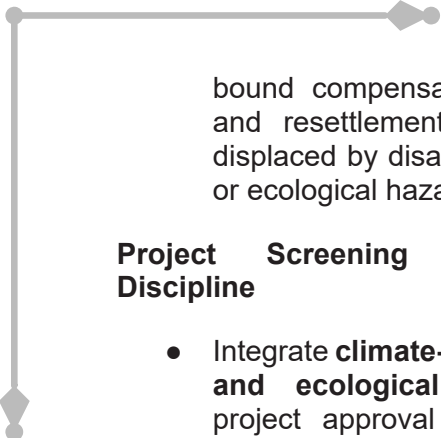
- Create formal interdepartmental coordination mechanisms linked to **planning, budgeting and project approvals**, rather than relying only on ad hoc consultations.
- Integrate local governments into state climate governance through **planning tools, technical support, measurable implementation frameworks and local climate action plans**. Kerala's ongoing processes show that local climate governance is already underway and should be expanded statewide.

Missions, Councils and Programmes under a Coherent Architecture

- Establish the **Kerala River Basin and Water Systems Mission** as a dedicated landscape-level mission with basin coordination platforms.
- Establish the **Western Ghats Ecological Governance Council** as the principal platform for science-based, participatory governance of the Western Ghats region.
- Launch the **State Mission for Invasive Species Removal and Forest Ecosystem Restoration** as a focused restoration mission under the forest and biodiversity framework.
- Establish **Kerala Wetland Mission** to coordinate mapping, legal protection and restoration of wetlands and floodplains.
- Establish a **Kerala Agroecology Transition Programme** to integrate the Organic Farming Mission, CREEA, paddy and wetland protection, homestead systems, seed sovereignty and plantation diversification.
- Establish a **Coastal and Marine Resilience Programme**, anchored by the Kerala Coastal Observatory,

to coordinate shoreline monitoring, tidal flooding adaptation, fisher livelihood protection and marine pollution preparedness.

- Establish an **Ecological Infrastructure and Monsoon-Responsive Engineering Programme** to support drainage continuity certification, ecological infrastructure audits and hydrology-sensitive engineering standards.
- Establish a **Sustainable Materials and Construction Regulation Programme** to align quarry regulation, quarry-cluster assessment, material-demand reduction, circular construction, alternative materials and ecological safeguards for the building sector.
- Establish an **Urban Ecology and Heat Resilience Programme** to support urban tree protection, wetland and canal restoration, drainage protection, heat action plans and biodiversity-sensitive urban planning.
- Establish a **Zero Waste and Pollution Prevention Programme** to coordinate waste reduction, plastic control, decentralised systems, specialised waste management, circular economy transition and pollution monitoring.
- Establish a **Sustainable and Regenerative Tourism Programme** to align tourism regulation with carrying capacity, ecological zoning, waste systems, community rights and local governance.
- Establish an **Energy Transition and Efficiency Programme** to coordinate renewable expansion, storage systems, demand-side management, transport energy transition and cooling-demand reduction.
- Enact a **Kerala Ecological Vulnerability and Climate Risk Rehabilitation and Resettlement Act**, modelled on the principles of the LARR Act, to guarantee time-



bound compensation, rehabilitation and resettlement for communities displaced by disasters, climate risks or ecological hazards.

Project Screening and Approval Discipline

- Integrate **climate-risk, hydrological and ecological screening** into project approval systems so that no major project proceeds without documented assessment of climate vulnerability, ecological impacts and

resilience implications.

- Establish a **Climate and Ecological Risk Screening Cell** linked to the planning and approval process to review major projects before financial or administrative sanction.
- Ensure that screening is linked to **ecological zoning, drainage integrity, slope stability, flood risk, emissions implications, livelihood impacts and carrying capacity considerations**.

Chapter 17

Land Use Policy and Land Governance Reform

Kerala's environmental crises are closely tied to the absence of a coherent land-use framework. Land decisions are currently governed by multiple laws and administrative systems - land reform law, land assignment rules, planning law, mining regulation, wetland protection, forest regulation and coastal regulation - administered by different departments with weak integration. This fragmented system allows wetlands to be converted, slopes destabilised, drainage systems blocked, fragile high-range landscapes degraded and large areas of cultivable land to remain idle.

Kerala already has a land governance base in the **Land Use Department** and its **LRIS 2.0 geospatial platform**, but these capacities have not yet been translated into a binding state-wide ecological land-use framework. The state has long recognised the need for a land-use policy; what is now required is to convert that recognition into a practical system of ecological zoning and spatial planning across the ridge-to-sea landscape.

A **Kerala State Land Use Policy** should not be treated as a technical mapping exercise alone. It must become the spatial backbone of ecological governance, linking forests, hill slopes, plantation regions, agricultural landscapes, wetlands, river basins, urban expansion zones and coastal belts within one planning framework. Implementing such a policy will require legal, institutional and planning reforms across several existing laws and departments.

To undertake this task in a systematic and transparent manner, Kerala should establish a **State Land Governance Reform Commission** to review the land governance framework and recommend the legal, institutional and spatial planning reforms needed to align land use with ecological resilience, sustainable agriculture and

responsible development.

What Kerala Should Do (Manifesto Commitments)

- Adopt a **Kerala State Land Use Policy** that establishes ecological zoning across forests, hill slopes, plantations, agricultural landscapes, wetlands, river basins, urban growth areas and coastal zones, and defines development limits and management strategies for each.
- Develop a **State Spatial Planning Framework** supported by geo-referenced ecological zoning maps that guide land-use decisions at state, district and local levels.
- Establish a **State Land Governance Reform Commission** to review Kerala's land governance framework and recommend the legal, institutional and planning reforms required to implement the Land Use Policy.
- Mandate the Commission to examine and align key laws and rules including the **Kerala Land Reforms Act, land assignment rules, plantation land regulations, town and country planning laws, mining regulations, wetland protections and coastal regulations**, so that land governance supports ecological resilience and productive, equitable development.
- Develop a coherent **ecological zoning and spatial planning framework** that guides infrastructure approvals, tourism expansion, quarry regulation, urban development and land-use change across sectors.
- Create legal mechanisms to enable **secure and regulated leasing of fallow cultivable land**, protecting



ownership rights while allowing farmer collectives, cooperatives and young farmers to bring uncultivated land back into production.

- Establish transparent systems such as **land banks or land pools** to bring uncultivated land into productive agricultural use.
- Clarify land-use governance in **high-range landscapes and plantation regions**, ensuring ecological safeguards while addressing long-standing tenure, land-use and

livelihood conflicts.

- Establish a **State Land Information System** integrating land ownership, land use, ecological zoning, planning permissions and restrictions, building on the state's geospatial capacities such as LRIS 2.0.
- Ensure that local-government development plans, master plans and district planning processes are aligned with the **State Land Use Policy and ecological zoning framework**.

Chapter 18

Environmental Data, Transparency and Public Oversight

Environmental governance cannot function on selective disclosure. Public trust depends on transparent, reliable and accessible information. Transparent data systems also enable evidence-based policymaking, independent scientific review and meaningful public participation.

Kerala is better placed than many states to build such a system. It already has environmental data dispersed across departments and institutions: pollution monitoring, wetland authorities, land-use mapping, forest geospatial systems, local climate-planning tools and budget documents. It also has a strong network of universities, research institutions and civil society organisations that can help generate, interpret and scrutinise environmental data. What is missing is a unified, public-facing system that brings this information together in usable form.

Without public access to environment-related information, citizens, journalists, researchers, local governments and affected communities cannot meaningfully engage in decision-making or hold institutions accountable.

What Kerala Should Do (Manifesto Commitments)

Establish a **Kerala Environmental Data Dashboard** that includes wetlands, floodplains, quarry permits and violations, pollution data, shoreline change, climate-budget allocations, river-health indicators, groundwater levels, wildlife conflict data, tourism pressure indicators and other key ecological metrics.

- Launch a **Digital Forest Monitoring System** to digitise forest boundaries, strengthen protection, prevent encroachments, reduce land disputes and support science-based forest management.

- Ensure that the Dashboard provides **district- and local-level access** wherever possible and is regularly updated in publicly usable formats.
- Ensure that all major environmental decision documents - including **environmental clearances, quarry permits, pollution compliance reports, wetland notifications, land-use zoning maps and ecological monitoring reports** - are publicly accessible through the data system.
- Publish **district-level environmental status reports** annually, covering ecosystems, pollution trends, land-use change, climate risks and compliance concerns.
- Publish an annual **State of Kerala's Environment and Climate Action Report** that integrates district reports, climate-budget data and implementation progress across sectors.
- Enable **social and environmental audits** so communities can review programme performance, compliance and project impacts locally.
- Strengthen collaboration between **scientific institutions, universities, civil society and government agencies** to improve data quality, interpretation and public oversight.
- Enable **open-data access and independent scientific review** of environmental datasets wherever possible, so that researchers and civil society organisations can analyse trends and support public accountability.

Chapter 19

Financing the Ecological and Climate Transition

Without budgetary commitment, policy remains rhetorical. Kerala's budgets and public-finance systems must align with ecological resilience, climate-risk reduction and long-term sustainability.

Kerala already has an important starting point: an **Environment Budget**, which has begun to identify environment-related expenditures. It has also issued green bonds. These are significant foundations, but they have not yet been fully organised into a fiscal framework for ecological transition. What is needed now is not only more funding, but better budget classification, stronger ecological screening of public investment, and dedicated financing streams for restoration and resilience.

Fiscal systems should reward ecological responsibility and discourage ecological harm. They should help prevent damage, not only finance repair after disasters.

What Kerala Should Do (Manifesto Commitments)

- Introduce **climate-tagged and ecology-tagged budgeting** so that departments identify mitigation, adaptation, resilience and ecological-restoration expenditures within their regular budget processes.
- Publish an annual **Environment and Climate Budget Statement** to improve visibility, comparability and accountability in public spending. Kerala's existing Environment Budget provides a useful foundation and should be expanded into a stronger tracking tool.
- Establish a dedicated **Ecological Restoration and Climate Resilience Fund** financed through enhanced royalties, pollution penalties, environmental compensation payments, ecological levies, climate finance and green budget allocations.
- Use this Fund to support **wetland restoration, river restoration, forest restoration, quarry-site rehabilitation, polluted-site clean-up, coastal resilience work, urban ecological restoration and local nature-based solutions**.
- Introduce **Ecological Fiscal Transfers** to local governments, linking a portion of allocations to measurable outcomes in wetland protection, waste management, watershed restoration, biodiversity conservation, urban heat reduction and pollution control.
- Provide **performance-linked grants** to local governments that achieve verifiable ecological outcomes, including restoration, climate adaptation, data transparency and compliance enforcement.
- Ensure that **major public investment decisions** are screened for ecological and climate implications before funding approval, including through KIIFB and other capital financing channels.
- Explore issuance of additional **green bonds or resilience-linked financing instruments** for large-scale ecological restoration, climate-resilient infrastructure, decentralised renewable energy and sustainable urban systems, building on Kerala's experience with green bonds.
- Require that public procurement and infrastructure financing prioritise **resource efficiency, circular construction, low-carbon materials and ecological safeguards**.

Chapter 20

Implementation, Monitoring and Public Accountability

Environmental commitments have meaning only when they are implemented consistently and transparently. The reforms proposed in this Charter must therefore be supported by clear systems for implementation, monitoring and public accountability.

Implementation should occur through the institutional architecture outlined in Part III, with sector departments, statutory authorities and local governments responsible for programme delivery. The Climate Action and Resilience Mission should coordinate across sectors, track progress and ensure that climate resilience and ecological safeguards are integrated into planning, budgeting and public investment decisions.

Monitoring must focus not only on policy implementation but also on ecological outcomes. Progress should therefore be tracked through measurable indicators such as wetland and floodplain protection, river health, groundwater recharge, pesticide reduction, renewable energy expansion, pollution compliance, wildlife conflict

mitigation and coastal resilience.

Transparency is essential for public trust. Environmental data, monitoring results and programme progress should be made publicly accessible through the environmental data systems proposed in this Charter. Annual reporting should consolidate these indicators and provide a clear picture of Kerala's ecological and climate progress.

Public participation is equally important. Local governments, scientific institutions, civil society organisations and community groups should have opportunities to review environmental performance, participate in monitoring processes and contribute to programme evaluation.

Environmental governance must remain continuous across political cycles. Regular public reporting, independent review and citizen oversight will ensure that the commitments outlined in this Charter translate into sustained action and measurable ecological outcomes.

Conclusion

Kerala's ecological future depends on choices made now.

This Charter offers a practical framework that links landscapes, livelihoods and governance from forest to sea. It proposes reforms across agriculture, forests, hills, rivers, wetlands, coasts, infrastructure, mining, cities, waste systems, tourism and energy within a unified ridge-to-sea ecological framework. It also sets out the institutional architecture required to implement these reforms through climate governance, ecological zoning, finance, transparency and public accountability.

The Charter rests on three linked principles. First, Kerala must govern its landscapes as

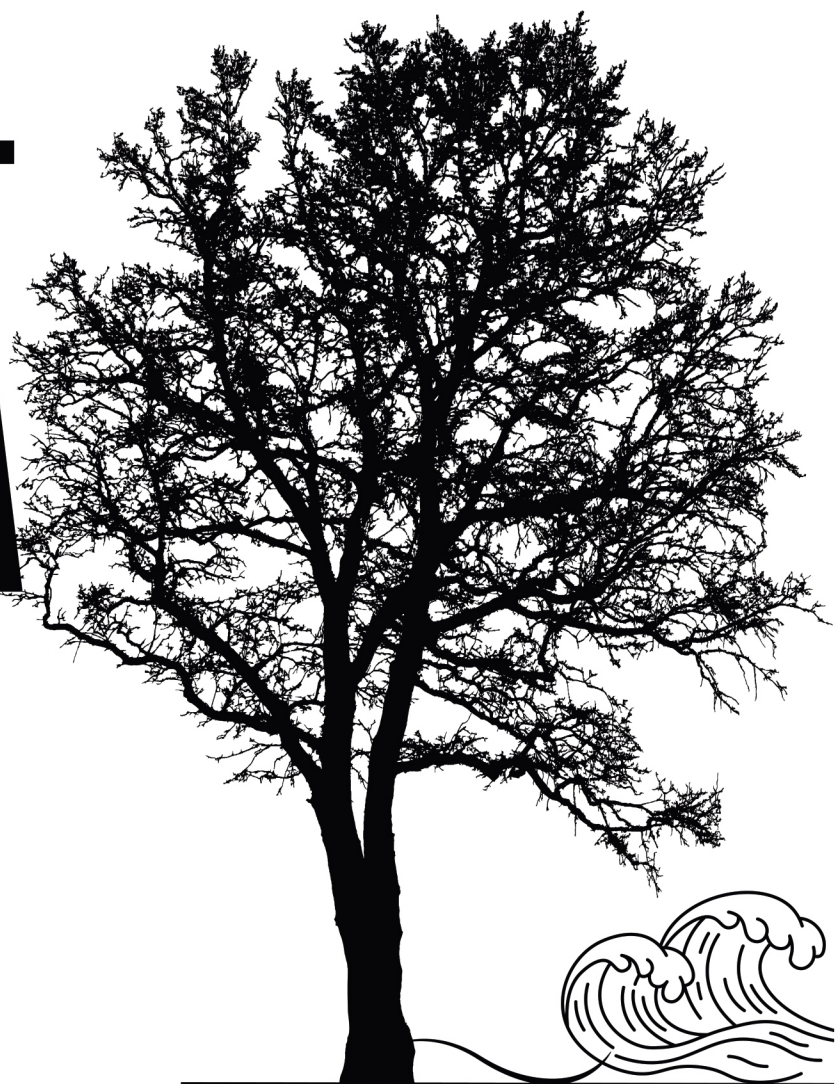
connected ecological systems from ridge to sea. Second, development must be aligned with climate resilience, ecological limits and long-term public safety. Third, environmental governance must be transparent, accountable and durable across political cycles.

Political parties are encouraged to adopt the recommended **Manifesto Commitments** in each chapter and commit to transparent implementation, public participation and measurable outcomes.

By doing so, Kerala can strengthen ecological stability, reduce climate risk, protect livelihoods and build a safer future for all.

FROM FOREST TO SEA

KERALA PEOPLE'S
ENVIRONMENTAL
CHARTER



Sahyadri Environment Summit-2026
Kerala Paristhithi Aikya Vedhi